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Chemical Works Conditions

THE most striking feature of the Chief Inspector's annual report on alkali, etc., works in England and Wales, abstracts from which are given, in this issue, is the prominence given to the prevention of the escape of dust, fumes, odours, etc., into the atmosphere. It is clear that this problem must receive greatly increased public attention in the near future. The controversy that is still going on over the Battersea power station, and other things, are indications of the drift of both technical and public opinion. It is, as Mr. J. Arthur Reavell, the President of the Institution of Chemical Engineers, has just been pointing out, unreasonable to permit the health of the public and the amenities of a district to be injured by noxious emissions from industrial works. Neither, on the other hand, can the country afford to arrest the development of industry at a time when industrial expansion is so necessary to national welfare. The obligation, therefore, falls on science to discover how industries shall be allowed to continue and grow without creating serious nuisance or danger to life, health, and property. Mr. Reavell, whose experience in this field is large and whose authority is weighty, regards all this class of problems as essentially those of chemical engineering, and he has full confidence in the power of the chemical engineer to devise means, which need not be prohibitively expensive, of eliminating the objectionable effects of certain operations, mainly of a chemical character. What is required is that the public interest should demand effective preventive measures and that the concerns themselves should be required to instal them.

Dr. Lewis Bailey speaks with obvious sympathy of the movement for eliminating nuisances, and testifies to the co-operation he receives from the heads of industrial concerns and to the gratifying progress that is steadily being made in this field. But he is not clear that a solution has yet been found for all the old difficulties, and meanwhile there are new problems arising in connection with cement manufacture—an industry of great and growing dimensions; with the use of cellulose paints, the mixing of bituminous road materials, and artificial silk works. It would seem, therefore, that in the future the treatment of such troubles must become a special and very important branch of chemical engineering practice.

In the case of cement the problem is a physical one. The extreme fineness to which grinding is now carried results in the escape not merely of the older familiar grit but of an "impalpable powder" very difficult to treat, and the Chief Inspector frankly recognises that more efficient methods than those now in use must be introduced. In regard to chemical and metallurgical processes, the problems are essentially chemical or chemical engineering. General advance, we are told, is being made in the recovery of sulphuric acid from the gases emitted from certain metallurgical operations, but Dr. Bailey cannot yet see the way of treating all gases containing sulphur acids. Sulphur dioxide, for example, when present in small proportions only in furnace gases may be removed by "scrubbing," but when present in minute proportions in very large volumes of furnace gases, this method is said to be impracticable; "there is," Dr. Bailey says, "no apparent method of dealing with cases of this kind." This is but one out of a large number of cases in which the problem is usefully discussed.

As regards the total number of works registered, these have declined from 1,152 in 1926 to 1,131 in 1927 and 1,096 in 1928. Sulphate of ammonia production again shows a marked advance. The 1926 output of 264,692 tons increased in 1927 to 399,587 tons, and by 1928 had reached the record figure of 549,516 tons. The gasworks seem to be outside this movement. Indeed, the production in 1928 of 145,066 tons was rather less than that in 1927 of 147,162 tons. On the other hand, the production by coke ovens, ironworks, producer gas, and synthetic nitrogen works has advanced from 132,215 tons in 1926 to 404,450 tons in 1928. The growth of the synthetic industry, no doubt, largely explains the rapid increase. The

Chief Inspector's remark that "the difficulties with which many, particularly the smaller, manufacturers of sulphate of ammonia are faced do not decrease" will not be challenged. The question of centralising on a large scale the manufacture of sulphate from gas liquor is briefly discussed, and the difficulties in the way are regarded as not insuperable; it is an idea that Mr. Parrish has more than once ably expounded in THE CHEMICAL AGE.

There is one passage on the scientific control of plant that will be read with special interest and satisfaction by works chemists. Pleading for continued effort after new and better methods, Dr. Bailey remarks: "Neither the control nor the research can be done without the man who is equipped by his scientific training to do it, and even he must be given the means for doing it. One wonders why so often the chemist in works must remain in his laboratory doing routine analyses without being encouraged to follow the details of processes in the works and to suggest modifications; he would, moreover, in such case take a more lively interest in his work."

The African Nitrate Discovery

THE fertiliser world seems destined to be the recipient of endless shocks. For several years past it has provided more than its share of sensational news, and the discovery of extensive tracts of sodium nitrate-bearing land in South-West Africa, reported last week by Professor J. S. Thomas to the British Association for the Advancement of Science, may well mark yet another new phase. Professor Thomas took a very cautious line in the matter. In view of its importance, from every point of view, it is to be hoped that the South African Government will attempt to supply the necessary information on the subject at the earliest possible moment.

From the Imperial point of view, a realisation of the hopes raised by the discovery would be a matter of very great importance. The Chilean nitrate industry, which has only just recovered from the onset of synthetic fertilisers, by means of complete reorganisation and an arrangement with the synthetic producers, would be faced by a very unpleasant situation, since it is clear that some of its markets could be much more advantageously supplied from South-West Africa.

Report on Factories and Workshops

THE annual report of the Chief Inspector of Factories and Workshops for the year 1928, which has just been issued (H.M. Stationery Office, pp. 149, 2s. 6d.), contains a good deal of information of interest to chemists. The elimination of dangers by the use of proper measures, even in difficult cases, is exemplified in the case of the eye trouble (due to sulphur compounds) arising in the viscose artificial silk industry. Following such trouble some years ago, one firm provided more efficient draught at the spinning machines. As a result, no cases of eye njury have been reported in the works of this firm during the past year.

A number of risks of fire, explosion and ill-health arise out of the growing use of cellulose lacquer spraying. As regards toxicity, benzol is believed to be the most dangerous ingredient, though it is used not as a solvent, but as a diluent. Some manufacturers have replaced it by other materials. The flash-point of cellulose lacquers also presents a difficulty, since, in the case of brushing lacquers, these may be used domestically by persons who might not properly appreciate the danger of fire. Such lacquers are now available with flash-points guaranteed to be 90° F. or above.

With regard to cases of poisoning during 1928, the following numbers were notified: Lead, 326 (43 deaths); mercury, 4; arsenic, 2 (1 death); carbon bisulphide, 1; aniline, 41; and chronic benzene, nil. The figures for aniline (41 cases) are of especial interest, since 15 occurred in the months of June, July and August, "to some extent," says the report, "indicating the influence of the hot weather in the production of poisoning." It seems probable that increased vapour pressure was a contributory factor. An eye is being kept on the use of lead tetra-ethyl in motor spirit (ethyl petrol). The men employed at the blending stations, where the lead tetra-ethyl is mixed with the petrol, are under strict medical surveillance. No cases of illness have been recorded at any of the blending stations.

Is Repetitive Work Really Dull?

SINCE Professor Pear's recent address in Manchester on "The Human Factor in Industry," some interesting opinions have come to us on one point—the evidence that many workers, when taken off purely repetitive work, have asked to be put back on it. At first sight, this might be assumed to indicate an almost total lack of mind. Yet, strangely enough, it has been found to be due to exactly the opposite quality. Within an hour or so of the lecture, an American visitor, holding a high position as a research director in the United States, and the possessor of a particularly virile and imaginative mind, was telling us how in his early days, brought up on a farm, he enjoyed the task of "pitching" hay or corn, or whatever the stuff might be, because not only was it a healthy physical exercise, but the routine left his mind free for other things and, indeed, seemed to stimulate mental activity. He had no difficulty at all in understanding the desire of a worker for purely repetitive work, which engaged a mechanical physical attention, and left a wide field for the free use of his thoughts.

This is a rather new point of view, but there is obviously something in it, and it may help to reconcile some who regard repetitive work as simply a soul-destroying form of occupation. For on this theory the girl who is engaged all day in sticking "eyes" into boots, or in filling tins of face powder, instead of being bored to death by monotony, may be keeping her soul alive with visions of her future home; and the male worker, mechanically working some stamping machine in which he takes no conscious interest, may have his mind happily occupied with thoughts of his motor car, or his allotment, or his evening studies in preparation for a promotion, or, it may be, his first adventure into business. So the much-despised repetitive job may after all be only a useful form of "pot-boiling."

Elimination of Sulphur Compounds from Flue Gases

By J. Arthur Reavell, M.I.M.E., M.I.Chem.E.

The following article on the elimination of sulphur compounds from flue gases, by Mr. J. Arthur Reavell, President of the Institution of Chemical Engineers, is of considerable technical and public interest. It deals with a problem that is attracting increasing attention, and indicates a service of first-class importance that chemical engineering science may be able to render.

A GREAT deal of interest has been displayed of late and many articles and letters have appeared in the daily Press regarding the question of flue gases from super-power stations, so many of which are in course of erection in various parts of the country.

The question of the pollution of the atmosphere by the large volumes of gases from a modern power station is a very important one when it is borne in mind that every hour two tons or more of sulphur in the form of sulphur dioxide and sulphur trioxide may be discharged into the atmosphere from one of these stations. No one can possibly blame the power engineer, as, at the moment, it is not legally incumbent on him to treat the gases in any way. The pollution of the atmosphere by large numbers of small stations has been going on for years, and it is only now, with the effort to concentrate power stations at one point in order to produce cheaper electricity, that this new problem has been raised.

The removal of sulphur compounds from flue gases is essentially a chemical engineering problem, and one that chemical engineers are constantly meeting and dealing with in the normal course of their work.

Chief Obstacles

It will be of interest to examine the chief obstacles that have to be met and overcome in preventing the pollution of the atmosphere in this way. The origin of the sulphur is to be found in the fuel which, in the course of combustion in the boilers, is converted into sulphur dioxide and trioxide. The percentage of sulphur in the original coal is usually very small and at first sight might appear negligible. It may vary from 0·5 per cent. to 3½ per cent. As, however, the quantities of coal handled in these large power stations are so great, the total quantity of sulphur becomes a very important figure; so that, even with as low a content as 0·5 per cent. sulphur in the coal, the dimensions of the problem will be realised when it is borne in mind that thousands of tons of coal are burned per day.

In addition to the sulphur in the gases, there is also the problem of dust removal, and here, again, this is not a matter of great consequence in the small stations, yet, with the large tonnage of coal used in the big stations, the dust problem also becomes one that has to be dealt with.

Fortunately, the method of removing the sulphur from the gases is, at the same time, a solution of the dust problem. It is assumed, of course, that one of the many types of centrifugal separators for dust removal is employed as at present, so that it is only the balance of the dust that has to be eliminated.

Washing of Flue Gases

The obvious method of dealing with the sulphur in the flue gases is to wash with water, and, while this may appear to be very simple in theory, there are certain practical problems that have to be dealt with in order to make the scheme a success.

The washing of the flue gases can be divided into two parts: the first is saturation of the gas with water vapour, and the second the scrubbing. Under average conditions it may be taken that the air passing into the furnaces for combustion is already 75 per cent. saturated, and that in passing through the burning coal a certain amount of water is added, due to moisture and hydrogen in the coal. Nevertheless, because the gases enter the flue at an appreciable temperature, they are actually far from being saturated with moisture and must be saturated before scrubbing is attempted.

Taking as an example a works power plant where gas washing is practised, the temperature at the exit from the economisers varies from 300 to 350° F., whereas in a modern power station where every possible B.T.U. is utilised the temperature is usually lower—say about 240° F. This question of temperature is important from the washing point of view because, with the higher temperature, more water is necessary to saturate the gases than at the lower temperature. The temperature of the gases leaving the flues and entering the chimney is important from the point of view of the dispersal of these gases into the atmosphere. If the flue gases are of sufficiently high temperature above the surrounding atmosphere, the tendency is for them to disperse at a high altitude, but if, due to washing, this temperature is kept too low, the problem is aggravated, and this must be borne in mind when arranging the washing system.

Method of Saturation

The method of saturation of the gases as they enter the flue is important. From the point of view of maintaining the draught, it is advisable to use hot water for saturating the gases entering the flue, as in this way the degree of cooling of the gases is minimised.

The saturation of the gases can be effected in many ways known to chemical engineers. One method is the passing of the gases through a vertical flue with propeller fillings or rings which are wetted in the usual way, but in actual practice it is found that this offers too much friction and is also expensive in construction.

The alternative method is to adopt some form of spray. The ordinary type of jet spray does not lend itself for use in any scheme where large quantities of water are used because any ordinary type of spray nozzle working under pressure is readily blocked up, unless some cumbersome form of filter is adopted. The obvious source of water for power stations is to utilise the condenser discharge. As this is taken from rivers or canals, some form of spray must be adopted that does not require any fine filtering methods, and enables water to be used containing matter in suspension.

The best method of spraying water for this purpose is some form of rotary atomiser, the atomiser being rotated independently of the water and the water discharged on to this rotating disc or roller from the outside.

Washing for Sulphur Removal

Having saturated the gases on their entrance to the flue, the next problem is to wash the gases so as to remove the sulphur. This washing should take place in a chamber so arranged that the large quantities of water required can be utilised in such a way that they present as large a surface as possible to the gases. It is advisable to reduce the speed of the gases considerably below the speeds ordinarily used in boiler flues and chimneys; otherwise there would be a tendency to discharge considerable quantities of vapour to the atmosphere. In addition to this, the time of contact between the water and the gases should be as long as possible.

With a satisfactorily designed chamber with an ample supply of washing water, it is quite easy to remove 90 to 95 per cent. of the sulphur compounds from the gases. For all ordinary purposes, there is no doubt that 90 per cent. should sufficiently cleanse the gases to pass them into the atmosphere without any deleterious effect either on people or buildings. Records are available of installations running for years where the efficiency of the washing has been 97½ per cent. In washing in this way, unless some eliminators are provided to remove the surplus water from the gases, a certain amount of entrained water is carried out of the chimney; but this can be avoided by means of any of the well known forms of eliminators which are fitted in a suitable position in the chimney or flue system.

[In connection with this subject, attention may be drawn to an announcement by the London Power Co., which appears on p. 109.—*Ed., C.A.*]

The Van't-Hoff Fund

THE VAN'T-HOFF FUND is prepared to make grants to investigators on pure or applied chemistry. Applications with details of the object for which the desired grant (the amount of which should be mentioned) is to be used may be addressed until November 1 to: Het Bestuur der Koninklijke Akademie van Wetenschappen, bestemd voor de Commissie can het "van't Hoff-Fonds," Trippenhuis Klovenievsburgwal te Amsterdam. The chairman of the fund is Professor A. F. Holleman.

Chemical Works in England and Wales

Annual Report by Chief Alkali Inspector

The annual report on chemical works in England and Wales, by Dr. T. Lewis Bailey, chief inspector, covers, as will be seen from the following extracts, practically every aspect of the industry. In addition there are appendices dealing with odours from artificial silk works and with the analysis and constitution of ammoniacal and spent liquors. A separate report, by Mr. J. W. Young, deals with alkali works in Scotland. The report is published by H.M. Stationery Office (pp. 31, 1s.).

THE number of works registered was 1,096, which entailed the inspection of 1,983 separate processes; there was thus a reduction of 35 in the number of works and an increase of 139 in the number of processes as compared with the previous year.

Scientific Control of Plant

Scientific control of plant has improved in recent years, and, furthermore, there is increased recognition of the value of research work, but still more is needed—above everything the spirit of research should be fostered.

It is surely abundantly evident that the methods employed in any chemical process cannot remain fixed; there must always be the striving to improve if continued success is to be ensured. The question is not merely how to produce a certain material, but how to produce it most easily, most economically, in the form best suited to the particular purpose for which it is subsequently to be used, always of the exact character demanded, and so on. All this can only be effected by careful chemical control on up-to-date scientific lines, and it entails continued research on the possibility of evolving entirely new methods of manufacture or variations in the existing methods.

Again, it is possible that some entirely different material may be found which will serve the purpose of the purchaser better than the one that is being provided. Neither the control nor the research can be done without the man who is equipped by his scientific training to do it, and even he must be given the means for doing it. One wonders why so often the chemist in a works must remain in his laboratory doing routine analyses without being encouraged to follow the details of processes in the works and to suggest modifications; he would, moreover, in such case take a more lively interest in his work.

Speaking generally, operations at registered works have been conducted in a satisfactory manner; infractions have been, with few exceptions, of a minor character, and there has been no need for serious action, remedy having always been promptly effected. Nevertheless, complaints have been received on a number of occasions; in fact, there was a slight increase in the number of complaints which required investigation. Those made against scheduled works were few and they were not of a serious nature. Cement works have this year given rise to complaint in different districts by reason of the amount of dust emitted from the chimneys.

Complaints of Dust, Odours, etc.

A considerable proportion of the complaints related to processes over which we have no control, such as odours produced by the use of cellulose paints and in the mixing of bituminous road material, also odours emanating from artificial silk works.

In the course of the year much useful work has been done by the department in connection with the manufacture of cement. The use of this material is now so varied and widespread that it is not surprising that methods of manufacture have changed considerably in comparatively recent times. It has become necessary, therefore, to look more closely into the results of the changes that have taken place, and work has been set on foot, and is being actively pursued, which it is anticipated will result before long in reducing at any rate the amount of solid particles emitted from the works. Even if one may not at the moment see any great incidental financial advantage to the manufacturer, yet it is a point not to be lost sight of.

Recovery of sulphuric acid from the gases emitted from certain metallurgical operations has continued to receive special attention. Gradual advance is being made, and although one cannot yet see the way to treating all gases containing sulphur acids, distinct progress has been made in the treatment of the gases from the calcination of sulphide ores. When sulphur dioxide is present in small proportions only in furnace gases, it is often possible to remove it by scrubbing the gases with water, or with milk of lime, or by passing them over wetted limestone—in fact this is a method, the adoption of which we frequently require, and further instances of it have arisen this year—but in such case there is no recovery of a useful product. When sulphur dioxide is present, however, in minute proportions in very large volumes of furnace gases, any method of this kind is impracticable; there is no apparent method of dealing with cases of this kind.

So much trouble has been experienced by gasworks managers in getting rid of the effluent from their ammonia plants that the work, initiated originally by reason of these difficulties, has been continued, and it is now possible to suggest, at any rate in a general way, steps which can be taken quite simply to ensure, in most cases, a way out of the difficulty.

Alkali Works Order, 1928

The Alkali, etc., Works Order, 1928, details of which were given in last year's report (pp. 4–6), came into operation on April 1, 1928. As a consequence there have been added 17 factories which previously were not subject to inspection under the Alkali Act, and the processes added in these and in works already registered under the Act for other processes were as follows:—Nitric acid 9, arsenic 2, paraffin oil 6, bisulphite 2, tar 2, benzene 142, pyridine 41, bromine 14, hydrofluoric acid 6. Much additional work has been entailed in getting all these provided with best practicable means for dealing with noxious gases, where such had not been already installed. Insistence on the introduction of methods for dealing with noxious gases has not resulted in any hardship to the manufacturers concerned; on the other hand, in a number of instances there has been financial advantage, owing to the incidental recovery of valuable material which was previously being lost, not, it is true, in any considerable concentration, but even comparatively small losses per hour amount to a good deal in the course of a year.

If recovery can be effected without unduly adding to working costs, it follows that it is worth doing even for its own sake. A careful study of the waste products, be they gaseous or be they liquid, from any manufacturing process is usually worth while; this is becoming more and more realised.

Alkali and Copper (Wet Process) Works

Operations have been entirely satisfactorily carried out; condensation of hydrochloric acid has in all instances been good. The maximum average escape of hydrochloric acid for any one work was 0·157 grain per c. ft., and the minimum, 0·02, the general average being 0·066. Percentage of condensation varied between 96·2 and 99·9.

Cement

This class of works has this year come more into prominence by reason of a number of complaints made concerning the amount of dust deposited in the areas surrounding several of them. The increasing size of rotary kilns means increased rate of production on a given area and consequently an increase of total dust, unless improved methods are employed for the deposition of the dust escaping from the process—that is to say, a higher percentage of dust deposition is necessary if conditions in the surrounding neighbourhood are not to deteriorate.

Furthermore, the method of introducing the slurry into the kilns was in some instances altered, at any rate for a time; spraying the slurry into the kilns is a method which has much to be said in its favour, but its use may give rise to a considerable increase in the amount of dust passing away with the kiln gases, as has been noticed, when unsuitable conditions of spraying are employed. One must remember, too, that the exceptionally dry summer which we have had allowed of the carrying of the dust to greater distances than would have been the case had the atmosphere and the neighbouring land been moist; but dust removal must be effected to such an extent that it cannot cause undue trouble even under the best weather conditions.

It has been necessary to take up this question with a number of the manufacturers of cement, and they have been found very anxious to co-operate. Various methods of dust deposition

are being investigated with a view to ascertaining what are the most efficient and at the same time the most practicable, having regard to the details of manufacture.

It is usual, of course, for dust chambers to be placed between kiln and chimney, but such chambers can only be effective to an extent which is relative to their size; their action depends essentially on the degree to which the speed of the dust-laden gases is reduced—the high temperature of the gases renders difficult, though perhaps not altogether impracticable, such secondary effects as would be obtained were cooling possible to such an extent that there would be deposition of moisture (and the water vapour contained in these gases is very considerable).

Were the dust particles of a sufficiently coarse nature a good system of chambers, which would give a really slow speed to the gases, would no doubt effect all that could reasonably be desired; but it must be remembered that the grinding of the raw materials is of such a character that fine particles are specially aimed at, and necessarily so; moreover, there is a tendency to increase further and further the fineness to which grinding is carried. It follows from this that much of the dust driven from the kilns is in the form of an impalpable powder, exceedingly difficult to settle out by ordinary gravitational methods, especially when diffused in a very large volume of high-temperature gases.

New Methods Needed

It is evident that other and more efficient methods must be introduced.

Machines of the fan type in which a high centrifugal velocity is given to the dust particles, which then escape from the gas stream, are being brought into use, and it remains to be seen how far such apparatus will effect the removal of the dust particles. It is not entirely a question of the percentage of separation that can be effected—a separation of 90 per cent. of the dust may be quite sufficient in one case to obviate nuisance, but in the case of larger works even this may still leave a sufficient amount of dust in the gases to cause trouble in the neighbourhood, and therefore it is necessary to aim at even higher efficiency than this.

Electrostatic precipitation is used in some cement works with considerable success, but this method has, as yet, made practically no headway in cement works in this country. It is true that initial costs are fairly high, but running costs are not high, and it is understood that 95 per cent. deposition of dust is quite well attainable. Electrostatic deposition plants are in use in England for a number of purposes, including the precipitation of acid fume, the deposition of metallic oxides from furnace gases and the cleaning of blast-furnace gases. Their effectiveness has been well established. When used for the recovery of metallic oxide dust, efficiencies run to over 99 per cent.; used for the cleaning of blast-furnace gases, when treating four million cubic feet of gas per hour (temperature 250° C.), efficiencies of 91–96 per cent. are attained, as chronicled by A. Grounds and H. W. C. Henderson in a paper on "Electrical Precipitation," read before the South Wales Institute of Engineers, November 22, 1927.

During the past year estimations have been made with a view to ascertaining, as far as possible, the amount of dust contained in the gases emitted from a number of cement works in various parts of the country. The results are interesting as showing the variability prevailing, and they may be taken generally as emphasising the great need for the extension of dust-collecting plant keeping pace with the progress of the trade, whether this be due to increased production or to the introduction of modifications in manufacturing methods.

Smelting Works

Works in the south-west of England, where tin concentrates are calcined, constitute the bulk of the works of this class. Acidities of the chimney gases are satisfactorily low; where the gases as they issue from the furnace possess an excessive acidity, it is usually sufficient to pass them through a water scrubber; in some instances towers containing limestone are required. Difficulty was experienced at one works where acidities were running higher than is desirable, but the whole plant has recently been redesigned and conditions now may be said to be satisfactory.

The smelting works which until recently gave rise to most anxiety were those in which zinc blende is calcined. At almost the whole of them the sulphurous gases are now transformed into sulphuric acid by the contact process, with consequent great improvement in the atmospheric conditions of the neighbourhood. In the first attempts to transform the calciner gases into sulphuric acid the ordinary lead chamber process was used; this entailed excessive nitre consumption, mainly by reason of the variable composition of the gases to be treated (an unusually high nitre content of the chamber gases had to be maintained), and the exit gases from the plant were so strongly nitrous that these in themselves formed an undesirable feature in the process by reason of their unpleasant and noxious character. The exploration of the possibility of substituting the contact process for the chamber process for the purpose has proved that this method has advantages in every way—the use of nitre is obviated and the process is capable of much better control.

In former days the acidity of the gases emitted from zinc blende calciners was considerable; it averaged over 12 grains, in terms of SO_3, per c. ft. Now the acidity of the gases from the contact plants is only one-third of this; moreover, improved methods of calcination have greatly reduced the volume of gases emitted to atmosphere, so that the improvement in local atmospheric conditions is even greater than is represented by the figures just stated. Even so, finality has not been reached; continual research by those responsible for the operations is giving promise of still better results than those hitherto attained. One cannot refrain from recording a word of congratulation to those engaged on the work—a great advance has been made.

There are still, however, problems in connection with smelting works that await solution. It is not always possible to prescribe a reasonable method of dealing with the sulphurous gases from metallurgical operations, an instance of this being the gases from lead smelting processes. If the installations are large, the erection of sulphuric acid plant may be warranted; for smaller works an acid plant would be impracticable; something less unwieldy is needed. An attempt to solve this problem has been made at one works during the past year, but, so far, the results have not been very promising.

Sulphuric Acid

The number of these works registered in 1927 was 100; it has now fallen to 92.

These works have been actively engaged, but it cannot be said that plants have operated to anything like full capacity. Pyrites, sulphur and spent oxide are all largely used as raw material. The use of ammonia oxidation plants for the provision of the necessary oxides of nitrogen continues to extend. Where such plants have once been installed, there seems to be no tendency to revert to the older nitre potting method.

The newer acid plants to be erected are usually on the intensive system, but there is still little desire apparently to consider actively the question of the use of acid spray in the chambers instead of water or steam. On the less intensive plants, at any rate, one would expect this to be an appealing introduction. Still, one must not forget that where existing plants do not need to be operated to full capacity there is little inducement to introduce new modifications of this nature in the process.

A complaint was received alleging nuisance from one sulphuric acid works. It appeared that occasionally the exit gases from the plant were unusually nitrous, and these gases formed the basis of the complaint. The total acidity of the exit gases was invariably satisfactory—well below the statutory limit—but nitrous emissions can be very unpleasant. The reason of the periodical variations in the character of the gases at this particular works was ascertained, and steps have now been taken which will, it is expected, lead to a cessation of the trouble complained of. In this connection one is constrained to refer again to the advantages that can accrue from a restricted water washing of nitrous gases from Gay Lussac towers; shortly, they are that excess SO_2 is recovered by such means (at the expense of escaping nitrogen oxides), and excess "nitre" escaping in the form of red oxides is capable of recovery. Persistent red colour of the exit gases is an objectionable feature, which should not be tolerated.

The highest average acidity of the escaping gases at any one sulphuric acid plant during the year was 3·09, the lowest average 0·20, and the general average 1·08.

Sulphuric Acid (Class II) Works

Concentration plants have, on the whole, worked satisfactorily. There have been difficulties to contend with in some instances where the exit acidities were somewhat high, but in every case the works managers have been prompt to act upon suggestions made and to adopt remedial measures suggested to them.

Complaint was received of excessive fume from one works. The exit acidities were satisfactorily low, but there appeared to be undue leakages from the plant itself, which, though in detail not very manifest, certainly tended to produce on the whole an undesirable atmospheric pollution. The entire plant has been overhauled with good result. *Contact plants* are by no means the rarity that they were a comparatively few years ago. All have been maintained in good working order. The exits from the plants themselves have lower acidity than was the case in the early days of their operation—details have been improved—yet even an acidity equivalent to 6 grains of SO_3 per cubic foot to atmosphere is not desirable. In most cases of this kind a soda wash has been added, whereby the acidity of the escaping gases is reduced to less than half a grain, and at the same time saleable bisulphite is produced.

Chemical Fertilisers

The trade is yet in a poor state, so far as the manufacture of superphosphate is concerned; nevertheless, operations have been considerable. Plants have been well maintained in all respects.

The results of the treatment of the waste gases have continued to reach the high level of recent years. The maximum average total acidity of the gases from the scrubbers was, in terms of the SO_3 equivalent of hydrofluosilicic acid, 0·21 grain per c. ft., the minimum practically nil; the average for all works operating was 0·07. Percentage removal of noxious gases varied between 94·0 and 99·9.

Gas Liquor, Sulphate and Muriate of Ammonia

There has been, speaking generally, satisfactory treatment of the noxious gases from ammonia plants, but one still occasionally finds oxide heaps that are in need of attention. It is not too much to expect that *always*, at installations provided with duplicate heaps, whenever there is the slightest sign of discoloration on the surface of the oxide the foul gas should be directed to a fresh heap immediately. In the case of small works, using one heap only, the addition of fresh oxide to the heap may serve a sufficiently useful purpose for a short time only; the plant should really be closed down and a fresh heap made; still, neither procedure should be necessary if a sufficient amount of oxide is provided at the outset to allow of the plant working through its full period. The provision of two heaps, with water-sealed change valve, is always to be preferred to a single heap.

There was a gassing accident at one coke-oven plant, which fortunately was not fatal. Two saturators are provided on the plant (semi-direct type) and both were in use at the same time, one being used as a compensator; when it became necessary to reverse the operations there was some confusion in the manipulation of cocks, and gas escaped. Two duplicate saturators should invariably be kept distinct and there should be physical disconnection, otherwise accidents of this kind are very apt to occur.

At one gasworks sulphate of ammonia plant a serious leakage of foul gas was found, which was due to the removal of a wooden plug from the main near the purifiers. Easily removable plugs of this kind should not be used on mains at all; they are too frequently displaced accidentally, or they may fall out owing to corrosion of the inner end. In any case, a plug is not intended to be used for relief purposes in cases of some little irregularity in the working of the plant, and if easily removable plugs are provided there is apt to be improper use of them.

The difficulties with which many, particularly the smaller, manufacturers of sulphate of ammonia are faced do not decrease. This is reflected in the figures for the number of works registered during the year; 470 sulphate and muriate of ammonia plants only were registered, as against 501 in the previous year; the number of gas liquor plants fell from 78 to 75.

The cost of producing sulphate from ammoniacal liquor at a small gas works is such as to become a charge on the manufacture of the coal gas, and the ammoniacal liquor, as such, has practically no value when considered as a possible saleable product; disposal of it as an ordinary works effluent presents difficulties that prevent this means of getting rid of it from being a way out of the difficulty. The position has aroused discussion among those interested in gas manufacture, and this has brought up again the possibilities of direct or semi-direct manufacture of sulphate as applicable to gasworks. Also the manufacture of sulphate of ammonia from gas liquor at central establishments has been suggested. Obviously, large works can operate more economically than small works, but there arises the question of transport of the raw liquor from the works where it is produced to any such central establishments. This difficulty should not be insuperable; there would be entailed, no doubt, either prior concentration of the original weak liquor to higher strength at the works of origin, or the production of a higher strength ammoniacal liquor, in the first instance, in the coal gas plant. The latter point is one which is worthy of more attention than has been given to it; it is intimately connected with suggestions which have been made during the past few years for the working of gas plant in such a way as to obtain cleaner ammoniacal liquor.

Reduction of the total volume of liquor produced, by doing the final scrubbing with sulphuric acid instead of with fresh water, has served a very useful purposes in a number of instances where sulphate of ammonia plants are available for the disposal of the acid liquor so obtained—this liquor being transferred to the saturator.

Disposal of Ammonium Sulphate Effluent

Apart from the economic question, the difficulty, so frequently experienced, of getting rid of the effluent from sulphate of ammonia plants continues to receive attention at the hands of the Sub-Committee of the Institution of Gas Engineers, who are exploring the practicability of methods suggested for improving the quality of ammoniacal liquors.

Meantime it may be well to indicate quite shortly what may be done fairly simply at works where the ammonia plant effluent disposal difficulty is acute and where extensive alteration to plant in general is not for the moment possible. The chief points to which attention may be drawn are:—

(1) Devil-liquor, which invariably contains a very large proportion of the total phenol, can be evaporated by spraying it upwards in a hot chimney, or it may be evaporated by direct heating if the vapour can be taken to a steam boiler chimney, or some of it may be got rid of at producer fires.

In such cases, however, the devil-liquor must be taken off from the hot end of the condensers in order to ensure absence of hydrocyanic acid and sulphuretted hydrogen. If taken off cold, devil-liquors contain hydrocyanic acid and a good deal of sulphuretted hydrogen, in which case such treatment as that suggested should certainly not be adopted.

(2) Steps can be taken to maintain a properly regulated flow of spent liquor from the works throughout the year. The object to be aimed at is to maintain as nearly as possible a constant composition, as represented by its oxygen absorption factor, of the total sewage where this is treated bacterially. The bacteria are particularly sensitive to sudden changes in the composition of the sewage which they are called upon to treat; the oxygen absorption factor of an ammonia plant effluent is many times greater than that of ordinary town sewage, and, therefore, intermittent admixture of an ammonia plant effluent with the town sewage causes considerable fluctuations of the total sewage composition, with consequent trouble at the sewage treatment works.

A storage tank for spent liquor should be provided, and in order to minimise the size of such tanks it may be advisable to work the sulphate of ammonia plant in such a way that shut-down periods are of shorter duration than formerly and actual working periods longer. This is usually quite feasible. This method of working the plant has, moreover, the very distinct advantage that a cleaner ammoniacal liquor is maintained in the well; for instance an ammoniacal liquor, which had an oxygen absorption of 500 parts per 100,000 when made, was found after remaining in the liquor well for four weeks to have an oxygen absorption of 850 (*see* 61st Annual Report, 1924, p. 17).

(3) As complete separation as possible of liquor from tar should always be effected at once—they should never be stored together.

As regards the constitution of gas liquors, work is being continued in our laboratory, as opportunity occurs, on the analytical side, in the hope that more light may be thrown on the nature of the constituents which give rise to the difference between total oxygen absorption of liquor and the sum of the oxygen absorption figures due to the known constituents. The difference figures vary widely, depending to some extent at any rate on the method of carbonisation employed in the coal gas manufacture. This is a very wide field, and there is room for many workers.

Muriatic Acid

In works where hydrochloric acid is made or is evolved in chemical operations, such as, for instance, chlorinations, recovery has been on the whole very good. There is no reason why it should not be practically complete. The operation of passing process gases through packed towers supplied with water is by no means difficult to control, and a good strength acid suitable for use can quite well be obtained ; passage of the gases through a series of jars containing water likewise gives excellent results. In one instance, where it was desired to recover the acid at the highest possible strength by means of towers, it was found necessary to take exception to the acidity of the gas at the exit of the plant and to require the addition of an extra small water scrubber for these final gases. The weaker acid obtained in the final scrubber can quite well be returned to the earlier part of the system. Tin plate flux works have continued to operate very satisfactorily

Sulphide Products

Several complaints were received alleging nuisance due to sulphuretted hydrogen escaping from works where sulphide products of various types are made. The portions of plant where sulphuretted hydrogen is evolved are generally under some pressure, and it is necessary, therefore, that covers on such portions of the plant must be maintained in good order —joints must be kept tight ; in fact, the sulphuretted hydrogen must be made to go where it is intended to go, viz., to the purifier provided for its absorption.

Attention to details of this kind has effected considerable improvement, and one many take this opportunity of emphasising here the fact that attention to even minute details may make all the difference between success and failure in the carrying out of chemical operations.

The point that one wishes to stress particularly in this connection is that the greatest care must be taken to prevent emission of sulphuretted hydrogen to atmosphere. It is not always realised that its smell may produce a more unpleasant sensation at some distance from a works than in the works itself.

Arsenic

By the Alkali, etc., Works Order, 1928, works in which any volatile compound of arsenic is evolved in any manufacturing process have been included in the schedule. There are works in which crude materials containing arsenical impurities are dissolved in acid, whereby a certain amount of arseniuretted hydrogen is given off ; if due care is not exercised serious trouble may ensue. Special attention has been given during the year to several works where this is the case and steps have been taken to effect improvement in the plant conditions existing.

Carbon Bisulphide Works

Works where carbon bisulphide is made have been very actively engaged, owing to the amount of this commodity required for the manufacture of artificial silk by the viscose process. There is no complaint to make regarding the condensation of the carbon bisulphide itself, but unfortunately its manufacture is accompanied by the evolution of sulphuretted hydrogen, and this may be considerable. Where produced, it must be dealt with in such a way as to obviate the possibility of nuisance. Its production is due to hydrocarbons contained in the charcoal used ; if carbonisation has not been properly effected in the making of the charcoal, the amount of hydrocarbons may be quite considerable, and what amounts practically to a second carbonisation may be absolutely necessary. In any case, such a preliminary heating of the charcoal should be carried out as may be required to enable it to be charged into the carbon bisulphide plant in proper condition.

Excessive production of sulphuretted hydrogen amounts to a waste of sulphur ; furthermore, the greater the quantity of it formed, the more work is required to prevent its emission to atmosphere—it is another instance of prevention being preferable to cure. If the amount of sulphuretted hydrogen produced be kept down to a minimum, there should be no difficulty in dealing with it satisfactorily by passage into heaps of oxide of iron. If operations are on a sufficiently large scale the employment of a Claus sulphur recovery kiln may be called for. Other methods may even suggest themselves, but burning the gas, with emission of the resultant sulphur dioxide to atmosphere, is not a reasonable procedure; if it is particularly desired to burn the gas, then some further means must be taken to deal with the sulphur dioxide produced.

It has been necessary to take exception to escape of sulphuretted hydrogen from carbon bisulphide works this year, and complaints have even been received ; hence the need for drawing special attention to the matter here at some length. Where there has been trouble the reasons for it have been carefully gone into, and improvement along the right lines has been required.

Paraffin Oil

The recent extension of the definition has brought under inspection six of these works. In practically all of them operations are on a very large scale. Crude petroleum contains varying amounts of sulphur compounds according to its place of origin, but, speaking generally, the amount of sulphur compounds is such as to give rise to the production of a considerable amount of volatile sulphur compounds during distillation, and these persist in the final uncondensed gases from the operations. To some extent the disposal of these gases has been dealt with to advantage, but the various operations are so detailed that a sufficiently complete investigation has not yet been possible. The industry is of comparatively recent growth in this country, and it presents a number of somewhat intricate problems.

Tar Works

The number of such works remains practically stationary. It is perhaps necessary to direct attention to the fact that it is now necessary to register, under the Alkali Act, not only the distillation of crude gas tar or coal tar (including, of course, dehydration by heat), but also the distillation of the products of such distillation where the evolution of any noxious or offensive gas is involved. Experience has shown the need for this ; it has been necessary to require the adoption of means for dealing with uncondensed gases at various works where crude products are distilled. At one such works subsidiary operations were a source of strong complaint in the neighbourhood of the works, and serious action was threatened by the local authority. The operation actually responsible was not one which was registrable under the Alkali Act ; the matter was, however, taken up by the District Inspector. Suggestions were made to the works manager, and these were acted upon, with the result that there appears now to be no further cause for complaint.

It is to be regretted that several instances of inefficiency in the treatment and disposal of the foul gases from tar distillation plants have been met with. An insufficiently low temperature at the cooler, during the early stages of distillation, was found on one occasion to be accompanied by considerable passage of steam ; the subsequent part of the plant prior to the oxide purifier, moreover, was apparently not working freely—the result is obvious. Plant installed for a particular purpose should invariably be carefully watched, to see that it is actually doing the work that is required of it.

Where the foul gases are to be burned, this should be done, if at all possible, at a fire which is always in use when the tar plant is being operated, such as the fire of the steam boiler, or the fire of the still itself. In cases where there is a bench of stills the foul gases are usually taken to a common main for final disposal, but there are instances of this common main being supplied with branches leading to each still fireplace, each branch being provided with a cock ; this is not at all a good arrangement. In the case of one works so provided it was this year necessary to issue a strong warning by reason of the fact that foul gases were actually passing to the fireplace of a still which was out of action. Were repairs in progress in connection with the idle still, such neglect might have serious consequences, even apart from any consideration of atmospheric pollution.

The use of enlarged covers at the pitch outlet of tar stills has further extended. Wherever it may be necessary for men to enter stills or similar plant, facilities for their getting out quickly and easily should be increased as far as possible.

A fatality happened at one tar works where a fire occurred which spread very rapidly to a pitch cooler in which two men were working, and it was impossible for the men to escape. It is difficult to say exactly how the fire originated, but immediately prior to it there had been in progress the operation of tar blending after dehydration, and preparation was being made for pumping the mixture away. Occurrences of this kind lead one to think that there are certain facts which are not sufficiently recognised.

Firstly, the introduction of even a comparatively small amount of water at any depth beneath the surface of hot tar, appreciably above 100° C. in temperature, may have serious results. The sudden transformation of a small quantity of water into steam will produce sudden pressure in all directions, and the higher the temperature the greater will the pressure be. The result of dropping a little water on to boiling tar is well known; the result of its introduction below the surface may mean sudden ejection of tar from the vessel.

Secondly, it is known that tar heated initially to 150° C. can be distilled by air-blowing, without further external heating. This fact should be borne in mind in cases where the blending of tar mixtures is effected by air-blowing; it must be made quite certain that the temperature of the mixture is sufficiently low to obviate any evolution of volatile fractionsl

Benzene

Works in which any wash oil used for the scrubbing of coa gas is distilled, or in which any crude benzol is distilled, have come under inspection this year. One hundred and forty-two such works have been registered, the bulk of which are at coke oven by-product plants. The amount of hydrogen sulphide evolved in the distillation of wash oil for recovery of benzene varies considerably according to the origin of the coal; in many instances it is considerable. Emission of this to atmosphere is certainly not desirable and steps must be taken to prevent it. The method which has been adopted generally at coke oven works is to connect vent pipes to the oven's foul-gas main on the suction side of the exhauster. Run-off pipes must, of course, be sealed with the liquid, and suction on the benzol house foul-gas main must be regulated. About ¼-in. suction is usually sufficient, and a water U-gauge should be provided. An incidental advantage in so dealing with the foul gases is that any benzene escaping from the vents, and formerly lost, is now returned to the coke oven system and recovered.

Where this method is not feasible, absorption by alkali, or even by oil scrubbing, may suffice. At works other than coke oven works the treatment of waste gases from benzol distillation by passage through a loosely packed scrubber, fed with alkali, has proved satisfactory. Acknowledgment is gladly made of the excellent co-operation of works managers in attaining the ends desired.

Treatment of waste gases, containing benzene, by dry oxide of iron, or even by a mixture of oxide of iron and lime, is not to be recommended. Instances of explosion in the purifier, when using these materials, have been noted; this is particularly likely to happen if there is an appreciable amount of benzene and if any local heating takes place.

Pyridine

Recovery of pyridine has been registered at 41 works. Pyridine has a most disagreeable and penetrating odour, and every possible care should be taken to prevent its emission to atmosphere. Complaints against tar works have in the past been traced to the pyridine section—hitherto not registrable. The trouble usually arises from the "springing" process, which should be done in such a way as to obviate escape of pyridine. Any exit containing pyridine can quite well be taken to an acid catch, where it is without difficulty completely absorbed. Considerable improvement has already been effected at works where this material is dealt with.

Bromine

There are 14 such works registered. It is satisfactory to be able to say that operations have in general been carried on without offence. Bromine is a material which needs to be handled with great care, and any emission of bromine fumes must be effectively guarded against.

Hydrofluoric Acid

Six works have been registered for this manufacture. On the whole, operations have been so conducted that little exception could be taken to the amount of hydrogen fluoride leaving the plant. Absorption must be practically complete if trouble is to be avoided, and in two instances the addition of extra scrubbing of the final gases has been provided. One hydrofluoric acid works gave rise to strong complaints for which there were certainly grounds. The matter was taken up strongly by the District Inspector, with the result that various modifications have been introduced, and it is anticipated that in future special care will be taken that the plant be so operated that all fluorine-containing gases are adequately dealt with.

NUMBER OF WORKS REGISTERED.

	1928	1927	1926
Alkali works	39	44	42
Scheduled and other works	1,057	1,087	1,110
Total	1,096	1,131	1,152

NUMBER OF SEPARATE PROCESSES OF MANUFACTURE UNDER INSPECTION.

	1928	1927	1926
Alkali:			
(*a*) Saltcake	35	39	37
(*b*) Copper (Wet Process)	7	8	9
Cement	37	43	43
Smelting	47	49	51
Sulphuric Acid	92	100	102
Sulphuric Acid (Class II)	71	73	74
Chemical Manure	75	78	80
Gas Liquor	75	78	79
Nitric Acid	64	57	56
Sulphate and Muriate of Ammonia	470	501	505
Chlorine	48	51	49
Muriatic Acid:			
(*a*) Muriatic acid other than Alkali works	60	66	67
(*b*) Tinplate flux	67	66	67
(*c*) Salt	38	40	42
Sulphide	74	77	76
Alkali Waste	2	2	2
Venetian Red	6	9	8
Lead Deposit	21	24	25
Arsenic	28	29	31
Nitrate and Chloride of Iron	31	31	29
Bisulphide of Carbon	6	7	7
Sulphocyanide	—	—	—
Picric Acid	3	4	4
Paraffin Oil	6	—	—
Bisulphite	46	40	36
Tar	361	363	378
Zinc Extraction	9	9	10
Benzene	142	—	—
Pyridine	41	—	—
Bromine	14	—	—
Hydrofluoric Acid	6	—	—
Total	1,983	1,844	1,867

AMOUNT OF AMMONIA PRODUCTS MANUFACTURED IN 1928.

Expressed as Sulphate (25¾ per cent. NH_3)—Tons.

From Liquor Produced in—	1928	1927	1926
Gasworks	145,066	147,162	132,477
Other Works (including Coke Ovens, Ironworks, Producer-gas, Synthetic, etc.)	404,450	252,425	132,215
Total	549,516	399,587	264,692

NOTE.—Of the total quantity of ammonia products, the equivalent of 44,983 tons was manufactured as concentrated ammoniacal liquor; the balance of 504,533 tons consisted of other ammonia products (sulphate, chloride, nitrate, etc.).

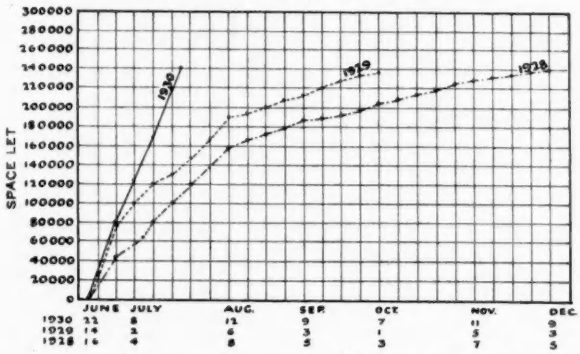
AMOUNT OF TAR PRODUCTS MANUFACTURED IN 1928.

Tar distilled	1,626,882
Pitch produced	420,749

British Industries Fair

Only Five Per Cent. of London Space Unlet

OVER six months before the opening of the next British Industries Fair, only 5 per cent. of the total space in the new and enlarged Olympia, where the London section of the Fair is to be held from February 17 to 28, remains unlet. In some trade sections of the London Fair there is no room left at all. This announcement was made at the Department of Overseas Trade on Tuesday, July 30, at a meeting of the advisory committee of exhibitors in the London section of the Fair, over which the new Minister for Overseas Trade, Mr. G. M. Gillett, M.P., presided for the first time. The



BRITISH INDUSTRIES FAIR, 1930.

APPLICATIONS FOR SPACE COMPARED WITH 1928 AND 1929.

arrangement of the various trade groups in the Olympia buildings was agreed upon and a sub-committee was appointed to consider the question of improving the general appearance of exhibitors' stands. It is stated that the applications for space in the heavy section of the Fair, which is held simultaneously in Birmingham, are such that the question of further extensions is again becoming urgent.

According to the scheme agreed upon by the advisory committee of the exhibitors in the London section of the British Industries Fair, the chemicals and drugs section will be in the annexe of the main hall, Olympia.

The graph shown herewith indicates the amount of space let at the Fair in various years, and gives some idea of the increasing demand.

Power Station Fumes

Company's Statement

THE London Power Co., Ltd., in a communiqué regarding Battersea Power Station, state :—" The company have noted with regret the renewed attacks that have recently been made in the Press and elsewhere upon the Battersea Power Station, and this notwithstanding the assurances that have already been given on behalf of the company. Unfortunately those from whom these attacks emanate have displayed no desire to ascertain the steps taken by the Power Co. to fulfil their obligations and to meet the objections to the erection of this station. The Power Co. desire to state in the most emphatic manner that their engineers and chemists have evolved a perfectly practicable and commercial solution of the sulphur problem in which they have complete confidence, and that the menace feared will be non-existent so far as the Battersea station is concerned. Letters patent have been applied for in connection with the process. The method and the results have been inspected by the Government chemists, and a full and complete report is about to be issued by the Power Co. to the Electricity Commissioners."

Uses of Butyl Alcohol

BUTYL ALCOHOL may (according to the Commercial Solvents Corporation of New York) be used for the prevention of frothing in the preparation of glue and in the sizing of paper, as well as for extracting water from organic liquids and for the drying of metal surfaces (if the latter are required quite free from moisture). Alone, or mixed with soap, it finds application in the cleaning of metal and leather, and in the extraction of fat from fur, wool and textiles.

A Note on the Late Dr. Ehrhardt

A Tribute from a Friend

THOSE who knew Dr. Ehrhardt will be glad to read this testimony by a friend regarding his life and work, and those who did not know him should be interested in the following details of his remarkable and unusual career.

Dr. Ernest Francis Ehrhardt was born in January, 1866, in Handsworth, Birmingham, a British subject. The latter is an unnecessary fact to record in view of Dr. Ehrhardt's essentially British outlook and activities, but it may be necessary to state it because of his long, successful, and exceptional career in Germany. The war found Dr. Ehrhardt about to reap the fruits of his long labours in that country, but without hesitation he sacrificed all that this meant to a man of his age.

This sacrifice was shared by his sons in another way. For William Hereward joined up in 1914, was a captain in the Birmingham City Battalion, was severely wounded in 1916, and died after several operations in 1923, having shown great promise at the beginning of a legal career. John Albert joined the Tank Corps from school, and was killed in France in 1918. Thus two sons paid the supreme penalty.

Dr. Ehrhardt was educated at King Edward's School, Birmingham, then at Mason's College, where he took the B.Sc. degree of London University. He proceeded to Munich and took his Ph.D. degree under Professor Baeyer, with whom he worked for two years. Shortly after this he obtained his London D.Sc. His scholastic career was brilliant.

From Munich, Dr. Ehrhardt went to the Badische Anilin and Soda Fabrik, in which he had the unusual experience of an Englishman attaining a very high position in the stronghold of the great German chemical industry, and acquired a unique knowledge of the chemical processes of the dyestuffs industry under Dr. Caro and his successors. He became an authority on British and American chemical patents, directed complex researches in that connection, and this work brought him into contact with the most prominent figures in the legal and chemical world in America, Germany, and England.

The Return to England

After war broke out he returned to England and managed the Mersey Chemical Works. Lord Moulton recognised in him one of the few men in the world, outside Germany, combining high scientific standing with a real comprehensive working knowledge of industrial organic chemical processes and of the ramifications of the industry. He invited his co-operation in the development of the British dyestuffs industry through the British Dyestuffs Corporation, of which Lord Moulton was chairman, where he rendered very valuable services. He had specialised for many years on the patent side of the vast synthetic chemical group, and was in that matter a world expert, Germany included. So that work was placed in his hands, and very ably guided and developed. He was also always at the disposal of the younger men who were actively managing and developing the industry, and few people could appreciate the cumulative effect of the great number of official and unofficial conferences which took place in Manchester in which Dr. Ehrhardt's knowledge was placed at the disposal of his colleagues in a most unselfish manner. In the hands of a man possessing anything but the highest moral qualities, his unique experience and knowledge would undoubtedly have been a force more profitable to himself. A year or two ago Dr. Ehrhardt left the Dyestuffs Corporation, and his deep knowledge of chemical patents at once found ample testimony when he joined Messrs. Mewburn, Ellis.

A great number of industrial organic chemists in England will wish to join me in paying this tribute to Dr. Ehrhardt as an individual. They will not forget the unselfish way in which from his great experience he assisted them on problems with the new processes, when five minutes of contact with such a man could replace weeks of costly works trials. Perhaps only they will appreciate fully, with time, how he performed the most difficult task of a prominent man in a rapidly developing and great industry, *i.e.*, the sinking of all personal advantage and intrigue in the interests of the concern and of an ideal. We must acknowledge the passing of a friend of great intellectual and high moral qualities, whose help and experience it is difficult, if not impossible, to replace.

V. L.

African Nitrate Discovery

Paper Before British Association

THE discovery of extensive nitrate deposits in South-West Africa, believed to be of considerable importance, was disclosed in a paper read before the British Association on Thursday, July 26, by Professor J. S. Thomas, of the University of Cape Town. Although careful to adopt a cautious attitude, he was of the opinion that if the indications and deductions proved justified there was no doubt that South-West Africa would provide an important economic source of supply of the commodity.

Nature of the Deposits

In the course of his paper Professor Smeath Thomas said that South-West Africa bore a strong resemblance to the conditions prevalent in Chile. There was an arid country in much the same latitude and height above sea level, and the physical and climatic conditions were alike in many respects. They had discovered and traced nitrates over an area of at least 10,000 square miles. The area started from Mariental in the North, and, moving fifty miles eastwards towards the Kalahari, they came to a place called Stampriet in the Auob River valley. As they went along farther they came across two more rivers, the Elephant and Nossob Rivers. Those rivers cut into a regular plateau, forming channels, and that was where the nitrate discoveries had been made. The presumption was that the deposits were really continuous along this plateau, but that had yet to be proved. But they had traced the deposits in each of the river valleys, and the nature of the rock was continuous, and it was therefore a pretty strong assumption that nitrates would also be found along the whole area mentioned.

Two Kinds of Deposits

The deposits were of two kinds. First there were the deposits in the rock of the cliffs which might be termed primary nitrate deposits, and which varied in content from two or three up to twenty per cent. sodium nitrate. Then there were secondary deposits which were found at the bottom of the cliffs. The secondary deposits, which might or might not be extensive, had been found very rich, with samples showing up to 86 per cent. nitrate. The tests so far showed that the deposits were very free from iodine. There was water in this region, though not on the surface. Artesian wells had been already sunk, capable of giving a total supply of 12,000,000 gallons daily. The railway was fifty miles distant, but once the deposits were proved to be economically workable the question of transport would present no difficulty.

Regarding the cost of working, it was not for him to say, but he thought, from comparative figures, that if it was proved that these extensive deposits contained from 10 per cent. of sodium nitrate upwards they could get a reasonable margin of profit of anything up to £3 or £4 per ton.

A typical analysis was as follows: Sodium nitrate, 15·98 per cent.; potassium chloride, 1·49 per cent.; sodium chloride, 5·56 per cent.; sodium sulphate, 5·29 per cent.; calcium bicarbonate, 0·81 per cent.

Professor Thomas, referring to the statement that British interests had investigated the nitrate deposits in South-West Africa with unsatisfactory results, stated that he did not think the area mentioned in his paper before the British Association had been visited.

Coke Ovens for Gas Works

THE Gas Light and Coke Co. announce that a contract has been placed for the erection at their works at Beckton, East Ham, of a battery of coke ovens, which will be the only coke ovens installed in any gas works in the British Isles. The company's engineers and chemists have visited America, Belgium, France, and Germany, as well as plants in this country. The contract has been placed with the Koppers Coke Oven Co., Ltd., of Sheffield. The ovens will be capable of carbonising 1,200 tons of coal a day, and will increase the output of these works by over 85,000 therms of gas a day. With the necessary handling and subsidiary plant the new installation will cost about £1,000,000 and take about two years to complete. It is being laid down so as to be capable of extension, if it proves satisfactory, by three further units of similar size.

Chemical Notes from Westminster

Questions in the House

MR. KELLY (House of Commons, July 25) asked the Minister of Health whether action was to be taken on the complaints which had been made regarding the emission of fumes from artificial silk works? Mr. Greenwood informed Mr. Kelly that the report of the chief alkali inspector was made as the result of complaints received. The report indicated that there was emission of fumes which might be objectionable, but that there was no evidence that the health of the community had suffered, and that manufacturers were spending time and money in seeking to improve the conditions. The inspector was keeping in close touch with the situation.

Mr. Lunn, in answer to a question by Mr. Mander (House of Commons, July 26), regarding the cultivation of tung-oil trees in the Empire, and the importance of the industry for the provision of raw material for home industries, said that inquiries as to the possibility of cultivating tung trees on a commercial scale in the Empire were made by the Imperial Institute in 1917, and had been followed up in recent years with the active co-operation of the Royal Botanic Gardens and the Paint Research Association. In 1928 supplies of seed obtained from Florida by the Director of the Paint Research Association were distributed to the following countries in the Empire, where experimental trials had since been started, namely, Australia, New Zealand, Union of South Africa, India, Southern Rhodesia, Ceylon, Kenya, Tanganyika, Nyasaland, Nigeria, Cyprus, Palestine and the West Indies. With the aid of a grant from the Empire Marketing Fund to the Royal Botanic Gardens, further supplies of seed had been sent this year to most of those countries. The Empire Marketing Board was fully alive to the economic potentialities of the product for the purposes referred to, and was now considering, in consultation with the Tung Oil Sub-Committee of the Imperial Institute, the directions in which it could most usefully co-operate in intensifying and developing the work already in hand.

Colonel Howard-Bury (House of Commons, July 24) asked the Under-Secretary of State for the Colonies whether he was aware that in the present state of agriculture the production in the third year of 1,000 tons of potash by Mr. Novomeysky's company was inadequate to the urgent needs of British farmers, and on what grounds the British plans which undertook to produce 100,000 tons of potash in the first year and 1,000,000 tons within five years were rejected.

Mr. Lunn replied that the tenderers in question were unable at the time to furnish the evidence required as to their financial resources.

Replying to a further question by Colonel Howard-Bury, Mr. Lunn declined to give the House any assurance that nothing would be done during the recess to ratify the agreement.

Dyestuff Imports by Sample Post

AN open general licence has been issued under the Dyestuffs Act, permitting the importation by sample post, as from August 6, of *bona fide* trade samples, without commercial value, of synthetic organic dyestuffs, colours and colouring matters, subject to the following conditions: (1) The gross weight of each packet must not exceed 8 ounces, and the Post Office Regulations regarding the Imperial and foreign sample post must be strictly complied with. (2) Each packet must bear the full name and address of the consignee; it must be addressed "c/o The Officer of Customs and Excise, Mount Pleasant Depot, General Post Office, London, E.C."; it must be conspicuously marked with particulars of the contents; and it must bear a statement that the contents are *bona fide* trade samples of no commercial value.

Appointments Vacant

CHEMIST for research on safety glass. Details on p. xxv.

PLANT CHEMIST for manufacture of cellulose acetate. Details on p. xxvi.

CHEMIST or Engineer or Chemical Engineer with experience in the manufacture of acetate silk. Details on p. xxvi.

WORKS CHEMIST for the manufacture of red lead and litharge. Details on p. xxv.

From Week to Week

MR. FRANK LAKE, B.Sc., of Newton Abbot, has been appointed a chemist in the London laboratories of the Radiation Co.

THE I.G. is said to be negotiating for the erection of a nitrogen products factory in the United States, and to have acquired land for the purpose in Louisiana.

UPON THE COMPLETION of a scheme at Preston for the extension to the offices of the Lancashire County Council, the County Analyst's department will be transferred from Liverpool to Preston.

IN AN ACCIDENT on Tuesday night at the Fleetwood Salt Works of Imperial Chemical Industries, John Ashton Wilson (27), an electrician, was caught by the belting and hurled into the machinery of the salt-grinding mill, sustaining terrible injuries.

THE ANNUAL REPORT of the Ministry of Health for 1928–29 states that of 67,000 samples of milk tested, 5,500, or 8·2 per cent., were adulterated or not up to standard. In 1926 the percentage was 7·4, and in 1927 6·9. Apart from milk, the proportion of adulterated foods and drugs was substantially lower than in previous years.

AN APPLICATION that imported Portland cement should be required to bear an indication of its origin was heard on Monday by the Board of Trade Committee under the Merchandise Marks Act. The application was made by the Institution of Cement Manufacturers, the respondents being the National Federation of Building Trade Employers.

AN EXTRAORDINARY GENERAL MEETING of Einstein's Electro Chemical Process, Ltd., was held on Wednesday in London for the purpose of passing a resolution to increase the capital of the company by the creation of 520,000 ordinary shares of 4s. each, which were to be issued as fully paid for the purpose of acquiring the Pigache Process. The resolution was duly passed.

THE BRITISH ROTARY FILTER CO., LTD., of Grimshaw Street, Preston, has been absorbed by International Combustion, Ltd., of 11, Southampton Row, London. Mr. H. J. Talbot, of the first-named company, will continue to handle the filter side of the business as hitherto. The products of the British Rotary Filter Co. include "Rovac" and "New Rovac" rotary filters, etc.

DR. A. L. BURLIN, consulting chemist, laid a scheme for the utilisation of waste materials by a National Waste Corporation before a meeting at the Holborn Restaurant, London, on Wednesday. Admiral Beamish, who presided, expressed a hope that the Government would provide the necessary backing, as the working capital required was estimated at £100,000. Steps were taken to form an executive committee.

THE COMMITTEE OF AWARD for the competition for the production of a reagent for the detection of dichloroethyl sulphide (mustard gas) consists of the following:—Professors F. Haber, Berlin; Sir William Pope, Cambridge; F. Swarts, Ghent; and G. Urbain, Paris. The secretary of the committee is the technical adviser to the International Committee of the Red Cross, Professor L. Demolis, Geneva. The committee of award will meet in Paris in April, 1931.

IN A REVIEW of the state of trade, in the July number of the Manchester Chamber of Commerce monthly record, it is stated that chemical manufacturers continue to do a steady trade, and for some products they have got rather better prices this month. Caustic soda, alkali, chlorates, bichromates, acetic acid and nitrate of soda are specially mentioned as having been in good request, and bleaching powder has gone off fairly well, considering the state of the textile trades.

MR. F. J. HAMBLY, F.I.C., managing director of the Electric Reduction Co., Ltd., of Buckingham, Quebec, and Oldbury, England, has been elected president of the Canadian Institute of Chemistry. Mr. Hambly was born in England and educated at the Royal College of Science. He afterwards acted successively as lecturer in chemistry at University College, Dundee, and head of the chemistry department at Robert Gordon's College, Aberdeen. He joined the Quebec works of the Electric Reduction Co. in 1898.

SYNTHETIC AMMONIA AND NITRATES, LTD., have decided to postpone their scheme for the construction of new docks at Middlesbrough. Keen disappointment is stated to be felt at the decision in view of the long-needed developments on the river. It is understood that a member of the Board of the Tees Conservancy Commissioners is to interview the Ministry of Transport shortly to ascertain what Government help would be forthcoming were the Commissioners to carry out a dock scheme of their own.

DR. D. S. ANDERSON has been appointed principal of the Birmingham Central Technical College, to succeed Dr. W. E. Sumpner, who recently retired. Dr. Anderson, who is 33 years of age, has been principal of the Derby Technical College since September, 1926. Previous to that date he was for two years head of the engineering department of the Derby Technical College. During the years 1922-24 Dr. Anderson held a full-time appointment in the mechanical engineering department of the Royal Technical College, Glasgow, where he was in charge of the post-graduate students. He also spent four years in the works of the North British Locomotive Co., Ltd., Glasgow.

SIR MAX MUSPRATT is lying ill at his home in Liverpool with severe internal inflammation and a high temperature.

THE DAMAGE caused by the explosions and fire at the Linde oxygen works in Northern Berlin last week is estimated at £25,000. About a thousand steel containers exploded.

SIR FRANK HEATH has accepted an invitation to become the secretary of the Universities Bureau of the British Empire, and will enter on his duries towards the end of September.

THE RADIUM DEPOSITS of North Portugal are, according to American statements, to be worked by a British company which will be formed for the purpose, and it is hoped to reach an annual production of 20 grams.

THE IMPERIAL SMELTING CORPORATION, LTD., with a nominal capital of £7,500,000, is to be registered immediately. This was announced by Sir Robert Horne at the annual general meeting of the National Smelting Co., Ltd.

THE ANNUAL MEETING of the Enka Art Silk Co. was held in Amsterdam on July 26, when the merger with the Glanzstoff Co. was approved. The company, which is to be known as the General Art Silk Union, proposes to issue 100,000,000 guilders new shares. Dr. E. Lunge, of Courtauld's, has joined the board of directors.

THE ABOLITION of the radium paint industry in the United States is recommended by the United States Department of Labour, because of the danger to the workers. Although the industry employs only 250 workers, 15 have died, and there are 18 cases of disease due to employment in the industry.

THE I.G. FARBENINDUSTRIE A.-G. has acquired a majority of the shares of the Behring-Werke A.-G., of Marburg. The latter firm will continue to operate under the same management as formerly, and the I.G. will centralise its production of sera at Marburg. It is further stated that the I.G. is considering the possibility of commercial application of the phosphate deposits which exist in the neighbourhood of Cape Town, South Africa.

DR. G. C. CLAYTON has written to the members of the Widnes Divisional Conservative Association Council stating his intention of not contesting the Widnes Division again. A deputation is to ask him to reconsider the matter. Dr. Clayton's primary reason for resignation is ill-health. The call upon his time as a director of Imperial Chemical Industries has been another important factor. It is understood that he contemplates a six months' holiday to recuperate.

THE GLENBOIG PLANT of the Bussey Coal Distillation Co. commenced operations on July 19, and a report on the results has been made by Mr. Parker, the consulting engineer and managing director. Until the plant is in full-scale operation, Mr. Parker says, precise figures as to yields will not be available, but, from the results obtained from the operation of the retorts now working, the yields of gas, oil and smokeless fuel, even at the necessarily slow starting speed, are fully up to expectations and published estimates. He adds that tests show that the smokeless fuel is of the highest quality; the oil has been well up to expectations, while the gas exceeded anticipations, both in regard to volume and quality.

THE LONDON COUNTY COUNCIL has awarded Robert Blair fellowships to Mr. Cyril Graham Davies, of Pen-y-Bryn, Gorseinon, Glamorganshire, and to Mr. George Low Riddell, 37, Windermere Road, Muswell Hill. Both are engineers with distinguished academic records. Mr. Davies, who is works manager of the Grovesend Steel and Tinplate Co., Gorseinon, will carry out a detailed investigation into modern developments of practice in steel sheet, tinplate and galvanised sheet manufacture in the United States. Mr. Riddell is the son of the principal of the London School of Printing. He proposes to study printing and its allied trades in relation to its machinery processes and methods of production in Canada, the United States, and Germany. The Robert Blair fellowships, which carry a grant of £450, are the most valuable awards in the gift of the London County Council.

THE ELECTRIC FURNACE CO., LTD., of 17, Victoria Street, London, S.W.1, have recently concluded an agreement with Hirsch-Kupfer und Messingwerke A.G., Eberswalde, Germany, in accordance with which they have the right to the British and French patents, and the use of drawings and information relating to the various types of electric resistance furnace developed by the latter company. The German firm have applied electricity to metal melting, annealing, and reheating on a very large scale, and their furnace equipment includes continuous strip annealing plant side-charged tube annealing furnaces, bright annealing furnaces and furnaces for reheating ingots, in addition to a large battery of Ajax-Wyatt and Ajax-Northrup furnaces. The total consumption of electricity for furnaces at these works is about 18,000,000 k.w. hrs. per annum.

Obituary

PROFESSOR WALTER HERBIG, of Chemnitz, Germany, recently. He was very well known as an authority on the chemistry of textiles and fats, and in particular on Turkey red oil.

References to Current Literature

British

ANALYSIS.—The application of the iodimetric method to the estimation of small amounts of aldoses. M. Macleod and R. Robison. *Biochem. Journ.*, Vol. XXIII, No. 3, pp. 517–523.

Notes on the determination of arsenic by the Marsh-Berzelius method. A. T. W. Colley and H. C. Lockwood. *J.S.C.I.*, July 26, p. 226.

GENERAL.—The chemical constitution of the gums. I. The nature of gum arabic and the biochemical classification of the gums. A. G. Norman. *Biochem. Journ.*, Vol. XXIII, No. 3, pp. 524–535.

Process development. A. D. Little. *J.S.C.I.*, July 26, pp. 202–209 T.

The electrolysis of molten zinc chloride. Sir R. Threlfall. *J.S.C.I.*, July 26, pp. 210–223 T.

The effects of thinners on the viscosity of nitrocellulose. B. M. Pam. *J.S.C.I.*, July 26, pp. 223–226.

VITAMINS.—The distribution of vitamin B_2 in certain foods. W. R. Aykroyd and M. H. Roscoe. *Biochem. Journ.*, Vol. XXIII, No. 3, pp. 483–497.

WOOD.—The effect of partial decay on the alkali solubility of wood. W. G. Campbell and J. Booth. *Biochem. Journ.*, Vol. XXIII, No. 3, pp. 566–571. Evidence is adduced for regarding decay of the brown rot type in Sitka spruce as an acid hydrolysis.

United States

ANALYSIS.—The determination of ammonia and amide nitrogen in tobacco by the use of permutit. H. B. Vickery and G. W. Pucher. *J. Biol. Chem.*, July, pp. 1–10. The ammonia is distilled from the untreated or hydrolysed sample according to the technique of Folin and Wright, is taken upon permutit, and determined colorimetrically by Nessler's reagent.

APPARATUS.—The Carpenter form of the Haldane gas analysis apparatus. Changes made in the apparatus and details regarding its use. T. M. Carpenter, E. L. Fox, and A. F. Sereque. *J. Biol. Chem.*, July, pp. 211–230.

GENERAL.—The system cupric oxide-sulphur trioxide-water. E. Posnjak and G. Tunell. *Amer. Journ. Science*, July, pp. 1–34. The system has been studied over the temperature range 50–200° C. The following solid phases were encountered: CuO; $4CuO.SO_3.3H_2O$; $3CuO.SO_3.H_2O$; $3CuO.2SO_3.5H_2O$; $CuO.SO_3.3H_2O$; $CuO.SO_3.H_2O$; and $CuO.SO_3$.

German

ANALYSIS.—The determination of silicon. T. Heczko. *Zeitschrift analytische Chem.*, Vol. 77, Parts 9–10, pp. 327–328.

The end-point of titration in the determination of tartaric acid according to Goldenberg. D. A. Uhl. *Zeitschrift analytische Chem.*, Vol. 77, Parts 9–10, pp. 328–334.

A new rapid method for the determination of mercury. G. Spacu and G. Suciu. *Zeitschrift analytische Chem.*, Vol. 77, Parts 9–10, pp. 334–340.

A new rapid method for the determination of cadmium. G. Spacu and G. Suciu. *Zeitschrift analytische Chem.*, Vol. 77, Parts 9–10, pp. 340–344.

The iodimetry of a mixture of sulphide, sulphite and thiosulphate. R. Wollak. *Zeitschrift analytische Chem.*, Vol. 77, Parts 11–12, pp. 401–406.

ANALYSIS, ORGANIC.—The determination and separation of formaldehyde and acetaldehyde by means of methone (5 : 5-dimethyldihydroresorcinol). D. Vorländer. *Zeitschrift analytische Chem.*, Vol. 77, Parts 9–10, pp. 321–327.

A specific colour reaction for isobutyl alcohol. A. Kutzlnigg. *Zeitschrift analytische Chem.*, Vol. 77, Parts 9–10, pp. 349–352. Isobutyl alcohol gives with potassium ferrocyanide an orange coloration.

GENERAL.—Equilibria between metals and salts in the molten state. Part XVII. The equilibrium between calcium and sodium and their chlorides. R. Lorenz and R. Winzer. *Zeitschrift anorganische Chem.*, Vol. 181, Part 3, pp. 193–202.

Molecularly dispersed silicic acid. H. Brintzinger and B. Troemer. *Zeitschrift anorganische Chem.*, Vol. 181, Part 3, pp. 237–248.

The distribution of strong bases and strong acids in saturated aqueous solutions. W. I. Nikolajew. *Zeitschrift anorganische Chem.*, Vol. 181, Part 3, pp. 249–279.

The addition of ammonia to lead nitrate and to lead sulphate. W. Krings. *Zeitschrift anorganische Chem.*, Vol. 181, Part 3, pp. 309–336.

The degradation of potassium permanganate in oxidation reactions to solid manganese oxides. B. Reinitzer and F. Hoffmann. *Zeitschrift anorganische Chem.*, Vol. 77, Parts 11–12, pp. 407–441. The gravimetric determination of manganese; of chromium in acetic acid solution; of arsenic acid in acetic acid solution; and an analysis of the precipitate formed from a permanganate solution on standing for years.

REAGENTS.—The preparation of organic reagents in the analytical laboratory. I. Diphenylcarbazide and diphenylcarbazone. K. H. Slotta and K. R. Jacobi. *Zeitschrift analytische Chem.*, Vol. 77, Parts 9–10, pp. 345–348. The first of a series of papers in which will be described methods of preparation of organic chemicals used in analysis.

Miscellaneous

ANALYSIS.—The determination of methylene blue. M. François and L. Seguin. *J. Pharmacie et Chim.*, July 1, pp. 5–9 (in French).

A volumetric method for the determination of mercury. L. Colombier. *J. Pharmacie et Chim.*, July 1, pp. 15–24 (in French).

The thiocyanate value and its determination. III. A new method of determination of the composition of fats by means of the thiocyanate value. W. Kimura. *J. Soc. Chem. Ind. Japan* (supplemental binding), July, p. 187 (in German).

A simple method for the determination of acetaldehyde. Y. Tomoda. *J. Soc. Chem. Ind. Japan* (supplemental binding), July, pp. 197–199 B (in English). The method is based on the dissociation of acetaldehyde bisulphite in alkaline solution.

Determination of alcohol in the presence of acetaldehyde Y. Tomoda. *J. Soc. Chem. Ind. Japan* (supplemental binding), July, pp. 199–201 B (in English). By adding sodium bisulphite to the sample, the aeration method of Dox and Lamb (*J. Amer. Chem. Soc.* (1916), 2561) has been so improved that the presence of acetaldehyde does not interfere with the determination within the accuracy of three per cent.

The determination of sulphur in liquid organic substances. S. Landa. *Collection of Czechoslovak Chem. Communications*, July, pp. 397–400 (in French).

APPARATUS.—An osmometer for measuring the osmotic pressure of colloids. A. Grigaut and A. Boutroux. *Pharmacie et Chim.*, July 1, pp. 9–15 (in French).

CEMENT.—Studies on mixed Portland cements. II. S. Nagai. *J. Soc. Chem. Ind. Japan* (supplemental binding), July, p. 190 B (in English).

Small-piece testing of the strength of cement mortar. S. Nagai. *J. Soc. Chem. Ind. Japan* (supplemental binding), July, pp. 191–193 B (in English).

GENERAL.—Investigations on derivatives of fatty acids. I. Improvement in the method of preparation of stearolic acid. K. Kino. *J. Soc. Chem. Ind. Japan* (supplemental binding), July, pp. 187–188 B (in German).

Studies on coke and charcoal. IV. Form of carbon composing coke and charcoal. Y. Oshima and Y. Fukuda. *J. Soc. Chem. Ind. Japan* (supplemental binding), July ,pp. 208–210 B (in English).

ORGANIC.—The condensation products of phenols and aldehydes. XIV. Intermediate products containing nitrogen. Part 1. T. Shono. *J. Soc. Chem. Ind. Japan* (supplemental binding), July, pp. 212–214 B (in English).

p-Bromobenzoylacetone, its isonitrose- derivative and the corresponding dioxime. J. Hanus, A. Jilek and J. Lukas. *Collection of Czechoslovak Chem. Communications*, July, pp. 392–396 (in French).

Oleosylvic acid. F. Balas and R. Hazukova. *Collection of Czechoslovak Chemical Communications*, July, pp. 401–410 (in English). The oleosylvic acid isolated by Schulz from the resin oil of American colophony is shown to be a mixture of *d*-pimaric and *d*-abietic acids.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

314,573. Aromatic Nitro Compounds, Reduction of. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 29, 1928. Addition to 263,376.

In the usual process for the reduction of aromatic nitro compounds to the corresponding amines by means of iron and an acid salt, the iron is transformed into an oxide which is of little use as a pigment. In this invention, the reduction is effected in the presence of an aqueous suspension of a sparingly soluble basic compound of a tri- or a tetra-valent metal, such as a hydroxide, oxide, or basic salt. The amine is separated and the iron hydroxide washed, dried, and calcined. The basic compound is preferably in finely dispersed or colloidal form, and may consist of aluminium hydroxide or oxide, basic aluminium sulphate or silicate, iron hydroxide or oxide, cerium hydroxide, oxide, or dioxide, thorium hydroxide or oxide, basic thorium carbonate, lanthanum hydroxide or oxide, didymium hydroxide or oxide, etc. The suspension of the basic compound may be produced from a solution of a soluble salt of the metal by the addition of the amino compound obtained as the product of the reduction. Examples are given.

314,593. Nitrogenous Vat Dyestuffs, Production of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application dates, February 4 and June 11, 1928.

These dyestuffs are obtained by heating nitro-dibenzanthrones, nitro-isodibenzanthrones, their derivatives, homologues, or reduction products with weak alkaline agents such as with salts of the alkalies or alkaline earth metals and weak acids, such as sodium or potassium acetate, potassium carbonate or formate, etc., in the presence of solvents or diluents and/or metals or metal compounds, such as copper, iron, mercury, or their compounds. The solvents include nitrobenzene, trichlorobenzene, nitrotoluene, nitronaphthalene, etc. The nitro-dibenzanthrone obtained according to specification No. 220,212 (See The Chemical Age, Vol. XI, p. 270) may be used. The dyestuffs give usually blue alkaline hydrosulphite vats and are very fast. The dyeings on vegetable fibres are grey or grey-black.

314,639. Materials in Granular Form, Production of. C. C. Smith, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Imperial Chemical House, Millbank, London, S.W.1. Application date, May 9, 1928.

Fertilizer salts are obtained in granular form suitable for storing or distribution by passing the molten salt in thin streams or drops into a body of oil in which it is insoluble, at a lower temperature. The oil must be such that the boiling point is not reached adjacent to the immersed drops. In an example, calcium nitrate with or without ammonium nitrate in a molten state at 80° C. is dropped in a thin stream into paraffin oil. The granules are separated and centrifuged or allowed to drain. The film of oil on the granules prevents absorption of moisture.

314,646. Esters, Manufacture of. Consortium für Elektrochemische Industrie G.m.b.H., W. O. Herrmann, and H. Deutsch, 20, Zielstattstrasse, Munchen, Germany. Application date, May 14, 1928.

These esters are obtained by the reaction of an ester of vinyl alcohol with a mono or polyhydric alcohol or phenol. The aldehyde which is also formed in the reaction is separated periodically or continuously by distillation or chemical combination. The reaction may be effected by passing the vapours over a heated surface, preferably with the use of a catalyst such as sulphuric acid, phosphoric acid, benzene-sulphonic acid, sulpho-acetic acid, mercury, sulphate, etc. Some examples are given.

314,652. Nitrogenous Dyestuffs, Production of. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 31, 1928. Addition to 285,502.

Specification No. 285,502 (See The Chemical Age, Vol. XVIII, p. 369) describes dyestuffs produced by heating poly-halogen-pyranthrones with such quantities of nitrogenous compounds in which at least one reactive hydrogen atom is connected to the nitrogen atom that some or all of the halogen atoms are substituted by nitrogenous radicles. It is now found that when nitrogenous carbocyclic compounds are used and some or all of the halogen atoms are substituted by nitrogenous carbocyclic radicles, the reaction proceeds more quickly and smoothly if copper or a copper compound is added as a catalyst in the proportion of about 5 per cent. of the theoretical yield of the reaction product. In addition, the tinctorial properties and fastness of the products are much improved. Examples are given of the reaction between tri- and tetrabrom-pyranthrones with alpha-amino-anthraquinone.

314,672. Azo Dyes and Their Application, Manufacture of. Imperial Chemical Industries, Ltd., Imperial Chemical House, Millbank, London, S.W.1, and R. Brightman, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, June 27, 1928.

Acid disazo dyestuffs are obtained by the combination of tetrazotised 4 : 4^1-diamino-diphenyl-di- or tri-sulphide with two molecular parts of a sulphonated pyrazolone, such as 1 : 4^1-sulpho-phenyl-3-methyl-5-pyrazolone or 1 : 5^1-sulpho-phenyl-3-methyl-5-pyrazolone, or 1 : 4^1-sulpho-2^1 : 5^1-dichloro-phenyl-3-methyl-5-pyrazolone. The dyestuffs are particularly applicable for wool and viscose silk.

314,697. Purification of Crude or Impure Sulphur. The Manchester Oxide Co., Ltd., and R. H. Clayton, Canal Street, Miles Platting, Manchester. Application date, July 24, 1928.

The process is for the purification of crude sulphur obtained in the extraction of spent oxide by sulphur solvents, or recovered in the purification of coal gas. The sulphur is melted and sulphur trioxide bubbled through it, whereby the organic impurities are rendered insoluble in the sulphur and filtered off. The impurities are partly charred and partly sulphonated, and any inorganic impurities are retained with them. Air may first be blown through the molten sulphur to oxidise any readily oxidisible bodies, or to remove any volatile matter. The sulphur trioxide is mainly reduced to dioxide, and may be regenerated by passing over ferric oxide in the presence of air for use again. The sulphur should be kept just above melting point.

314,725. Working up Potash Salts, Process of. A. L. Mond, London. From The Rhenania-Kunheim Verein Chemischer Fabriken Akt.-Ges., 10, Reichstagsufer, Berlin, N.W.7. Application date, September 13, 1928.

Potash salts are dissolved in water and then treated with ammonia gas in the presence of ammonium chloride, so that the potassium sulphate is separated out in amount equivalent to the magnesium sulphate in the crude salt. The potassium sulphate is removed and the solution treated with ammonia and carbon dioxide or ammonium carbonate to precipitate magnesium carbonate and/or magnesium-ammonium carbonate. The precipitate is removed, and the solution converted into sodium bicarbonate by treating with ammonia and carbon dioxide. The mother liquor consists of ammonium and potassium chloride and ammonium sulphate, and may be used as a fertiliser or for treating further quantities of crude potash salts. The magnesium carbonate may be treated with potassium chloride and carbon dioxide to obtain potassium magnesium bicarbonate, and the solution containing potassium and ammonium chlorides may be converted into a fertiliser as above.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention: —285,840 (Soc. Anon des Matières Colorantes et Produits Chimiques de Saint Denis, R. Lantz and A. Wahl) relating to Azine dyestuffs, see Vol. XVIII, p. 398; 287,577 (Soc. l'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Pro-

cédés G. Claude) relating to gaseous mixtures containing hydrogen, see Vol. XVIII, p. 496; 288,148 (I.G. Farbenindustrie Akt.-Ges.) relating to destructive hydrogenation of coal, oil, etc., see Vol. XVIII, p. 516; 288,291 (I.G. Farbenindustrie Akt.-Ges). relating to vat dyestuffs of the anthanthrone series, see Vol. XVIII, p. 535; 288,308 (I.G. Farbenindustrie Akt.-Ges.) relating to phenol from chlorobenzene, see Vol. XVIII, p. 535; 289,383 (Verein für Chemische und Metallurgische Produktion) relating to fluorine compounds with low silicon content, see Vol. XVIII, p. 615; 293,792 (I.G. Farbenindustrie Akt.-Ges.) relating to 4-amino-1-oxybenzene and N-derivatives, see Vol. XIX, p. 267; 294,117 (Elektrizitätswerk Lonza) relating to fertilisers containing nitrogen and phosphoric acid, see Vol. XIX, p. 296.

International Specifications not yet Accepted

312,582. Dyes. Chemische Fabrik vorm. Sandoz, Basle, Switzerland. International Convention date, May 26, 1928.

Diazotized monoaminoaryl sulphamides of the general formula NH_2-Aryl-SO_2 wherein the aryl nucleus may contain

substituents other than the nitro group in *p*-position to the diazotizable amino group and wherein R_1 and R_2 are the same or different alkyl-, aryl-, or aralkyl-radicles substituted or not, are combined with sulpho-1-aryl-5-pyrazolones and their derivatives or with 2 : 8 : 6-acid in acid solution. The products are monoazo dyes giving yellow to red shades on wool or silk.

312,630. Preserving Rubber. B. F. Goodrich Co., 1780, Broadway, New York. (Assignees of W. L. Semon, Cuyahoga Falls, Ohio, U.S.A.) International Convention date, May 29, 1928.

Disubstituted *p*-phenylene diamines are added to rubber to improve the ageing qualities.

312,648. Zinc Oxide. C. R. Beringer, 24, Nepszinhaz, U. Budapest. International Convention date, May 29, 1928.

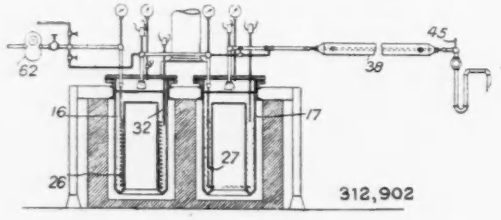
Zinc oxide is obtained by passing air over molten zinc in a reverberatory furnace which is rocked or rotated continuously or intermittently about an axis in the direction of motion of the air. The speed of revolution may be varied to vary the temperature of the bath, and the heat of the reaction partly or wholly maintains the necessary temperature.

312,664. Sodium Perborate. G. Schoenberg, 17, Benkenstrasse, Basle, Switzerland. International Convention date, May 30, 1928.

Crystalline sodium perborate is heated to 40°-100° C. with agitation in vacuo to expel three molecules of water of crystallisation and the dehydration is completed in vacuo at 100°-120° C. in a current of dry air, the pressure being preferably below 30 mm. The temperature where the water vapour leaves the apparatus should be lower than elsewhere.

312,902. Diphenyl. Federal Phosphorus Co., Anniston, Alabama, U.S.A. (Assignees of T. J. Scott, Anniston, Alabama, U.S.A.) International Convention date, June 2, 1928.

Benzol or benzene is forced by a pump 62 into a coil 26 in a bath 16 of molten lead at 600°-650° C. which is just too low for the formation of diphenyl. The gas then passes



through a pipe 32 and pipe 27 into a bath of molten metal 17 at 750°-800° C. Diphenyl is formed and the vapour passes through a water-cooled condenser 38.

312,685. Phosphorus Chlorides. E. Urbain, 6, Rue Lyautey, Paris. International Convention date, May 31, 1928.

When ferrophosphorus is treated with dry chlorine in excess, the resulting mixture of phosphorus pentachloride and ferric chloride cannot be separated by distillation owing to the formation of the double compound $P.Cl_3.FeCl_3$. The mixture may, however, be treated with more ferrophosphorus below red heat, so that ferrous chloride and phosphorus trichloride are formed, and these may be separated by distillation. The trichloride may be treated with chlorine to obtain the pentachloride.

312,907. Thymol. Rheinische Kampfer-Fabrik Ges., Oberkassel, Düsseldorf, Germany. International Convention date, June 1, 1928. Addition to 293,753. (See The Chemical Age, Vol. XIX, p. 243.)

Thymol is obtained by heating *m*-cresol under pressure with propyl alcohol, dipropyl ether, propyl halides, or the corresponding isopropyl compounds, or other materials yielding propylene. When hydrogen halide is liberated it may be fixed by adding zinc or magnesium oxides. Water is removed by distillation. The thymol is separated by fractional distillation.

312,908. Hydrochloric and Hydrobromic Acids. Röhm and Haas Akt.-Ges., 42, Weiterstadterstrasse, Darmstadt, Germany. International Convention date, June 2, 1928.

Hydrochloric and hydrobromic acids are obtained by passing hydrogen and chlorine or bromine through a burner of copper or its alloys or lead at a sufficient velocity to prevent attack of the metal. The combustion chamber is water cooled to about 80° C.

312,916. Synthesis of Hydrocarbons. J. Mercier, 15, Rue d'Asterg, Paris. International Convention date, June 2, 1928.

A mixture of carbon monoxide and hydrogen is heated in the presence of iron, nickel, or cobalt in grains or powder on refractory carriers such as alumina, lime, or magnesia, or sulphides of iron, molybdenum, or tungsten, at 500° C. The gases are then suddenly expanded and cooled to 180°-300° C. in the presence of finely divided metals. The initial gas mixture may also contain steam to produce nascent hydrogen. The heavy and light hydrocarbons in the product are separated, and the heavy hydrocarbons heated wtih a fresh mixture of carbon monoxide and hydrogen. Hydrogen or steam may be added to the gases during the expansion and cooling step.

312,919. Pyridine Compounds. A. Boehringer, 75, Bingerstrasse, Nieder-Ingelheim-on-Rhine, Germany. International Convention date, June 1, 1928.

These compounds are obtained by treating pyridine compounds containing a $CH_2CO.R$ group in the 2-position or in the 2- and 5-positions with hydrogen in the presence of a hydrogenating catalyst such as nickel or platinum. One or both of the carbonyl groups is reduced to the carbinol, at which the reaction may be stopped or it may be continued so that the pyridine nucleus becomes hydrogenated.

Latest Notifications.

315,818. Catalysts, particularly for the production of ketones. Holzverkohlungs-Industrie Akt.-Ges. July 19, 1928.

315,756. Process of producing dyeings. Soc. of Chemical Industry in Basle. July 17, 1928.

315,854. Catalytic oxidation of organic compounds. Selden Co. July 21, 1928.

315,700. Production of diammonium phosphate. Federal Phosphorous Co. July 16, 1928.

315,835. Artificial resins. I.G. Farbenindustrie Akt.-Ges. July 19, 1928.

315,764. Manufacture and production of valuable liquid products from solid distillable carbonaceous materials. I.G. Farbenindustrie Akt.-Ges. July 17, 1928.

315,768. Electrolytic manufacture and production of fluorine. Fredenhagen, Dr. K. July 17, 1928.

315,769. Manufacture and production of fluorine. Fredenhagen, Dr. K. July 17, 1928.

315,809. Refining of hydrocarbons. Aktiebolaget Separator-Nobel. October 8, 1927.

315,810. Process of preparing highly-active carbon. Akt.-Ges. Für Stickstoffdünger. July 18, 1928.

315,811. Reduction of metallic compounds and production of arsenates. Kirsebom, G. N. July 18, 1928.
316,099. Manufacture of vat dyestuffs. I.G. Farbenindustrie Akt.-Ges. July 21, 1928.

Specifications Accepted with Date of Application

285,040. Forming briquettes from iron ore concentrates, Process for. P. Gredt. February 9, 1927.
288,555. Basic phenol alkyl ethers, Process for the manufacture of. I.G. Farbenindstrie Akt.-Ges., April 11, 1927.
288,977. Metal sulphates from sulphides, Manufacture of—and its applicati9n to gas-purification. I.G. Farbenindistrie Akt.-Ges. April 16, 1927.
293,754. Transforming olefines into alkylene chlorhydrins by means of chlorine water. Method of. T. Goldschmidt Akt.-Ges. July 11, 1927.
294,582. Quarternary ammonium compounds, Manufacture of. Soc. of Chemical Industry in Basle. July 26, 1927. Addition to 219,304.
295,270 and 300,968. Catalytic oxidation of organic compounds. Selden Co. August 8 and November 21, 1927.
302,640. Iron-chromium-aluminium alloys, Method of rendering ductile. V. B. Browne. December 19, 1927.
306,803. Catalytic hydrogenation of non-nitrogenous organic compounds. Selden Co. February 25, 1928.
315,193. Decomposition of hydrocarbons into hydrocarbons containing fewer carbon atoms. A. J. van Peski. January 18, 1928.
315,200. Derivatives of the benzene, naphthalene, and acenaphthene series, Manufacture of. L. J. Hooley, J. Thomas, and Scottish Dyes, Ltd. January 3, 1928.
315,249. Valuable unsaturated hydrocarbons, Manufacture of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*) April 10, 1928.
315,328. Dyestuffs, Production of. R. S. Barnes, J. E. G. Harris, B. Wylam, J. Thomas, and Scottish Dyes, Ltd. January 9, 1928.
315,439. Desulphurisation of hydrocarbons. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) January 14, 1928.
315,331. Naphthalene derivatives, Manufacture of. British Celanese, Ltd., G. H. Ellis, H. C. Olpin, and E. W. Kirk. February 7, 1928.
315,444. Commercially pure iron alloys, Process of making. L. F. Reinartz and J. H. Nead. February 14, 1928.
315,451. Dis- and poly-azo dyestuffs, Process for the manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) April 11, 1928.
315,459. Metallic oxides or other compounds, Process for treating with hydrocarbons. H. Wade. (*Soc. Italiana per le Industrie Minerarie e Chimiche.*) April 13, 1928.
315,481. Recovery of metals by electrolysis, Apparatus for. F. Collingridge. April 18, 1928.
315,485. Mixed fertilizers, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) April 18, 1928.
315,503. Heat-resisting alloys. L. Kluger and Oesterreichische Schmidtstahlwerke Akt.-Ges. April 27, 1928.
315,506. Vat dyestuffs, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) May 2, 1928. Addition to 291,546.
315,513. Hydrogenation of coal, oil, or the like. Apparatus for. K. Gordon and Imperial Chemical Industries, Ltd. May 12, 1928.
315,554. Vulcanized rubber, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) June 22, 1928.
315,595. Butadiene, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 11, 1928.
301,022. Calcined phosphates, Production of. Kali-chemie Akt.-Ges. November 23, 1927.

Applications for Patents

Allgemeine Ges. für Chemische Industrie Ges. and Groves, W. W. Refining hydrocarbons. 22,456. July 22.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of coloured reserves in textile printing. 22,485. July 22.
—— Manufacture of condensation products of oxides, etc., of mercurised hydrocarbons. 22,486. July 22.
—— Manufacture of valuable products from wood. 22,487. July 22.
—— Working up chromium ores. 22,488. July 22.
—— Manufacture of azo dyestuffs containing copper. 22,489. July 22.
—— Manufacture of derivatives of polyvalent alcohols, and azo dyestuffs therefrom. 22,795. July 24.
—— Manufacture of finely-divided pastes and precipitates of organic substances. 22,922. July 25.
—— Manufacture of cellulose esters. 22,923. July 25.
—— Manufacture of organic mercury compounds. 22,924. July 25.
—— Manufacture of aminohydroxyanthraquinones, etc. 23,050. July 26.
—— Manufacture of fatty acid derivatives. 23,051. July 26.
—— Manufacture of substitution products of sulphur dyestuffs. 23,162. July 27.
—— Manufacture of aromatic amino sulphochlorides. 23,163. July 27.
Coley, H. E. Manufacture of zinc, etc. 22,790. July 24.
Durand and Huguenin Akt.-Ges. Manufacture of basic dyestuffs. 23,018. July 26. (Germany, July 28, 1928.)
Etablissements Lambiotte Frères. Manufacture of di-alkyl sulphates. 22,498. July 22. (France, June 25.)
Goldschmidt, S., and Mayrhofer, R. Production of condensation products of urea. 22,496. July 22. (Germany, July 23, 1928.)
Grouchkine, L. Production of superphosphates. 22,946. July 26.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Apparatus for manufacture of ornamented paper. 22,451. July 22.
—— Manufacture of dyestuffs. 22,452. July 22.
—— Refining oils and fats. 22,453. July 22.
—— Manufacture of nitrous oxide from ammonia. 22,839. July 25.
—— Conversion of hydrocarbons. 23,031. July 26.
—— Recovery of high-molecular organic products. 23,181. July 27.
—— Lubricants. 23,182. July 27.
I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 22,457. July 22. (Germany, July 21, 1928.)
—— Manufacture of hydroxy 1[1] : 8′ naphthoylene-naphthimidazoles. 22,492. July 22. (Germany, July 23, 1928.)
—— Purification of vat dyestuffs. 22,662. July 23. (Germany, July 23, 1928.)
—— Manufacture of ortho hydroxy azo dyestuffs containing chromium. 22,925. July 25. (Germany, July 26, 1928.)
—— Production of chemically-pure phosphoric acid. 22,932. July 25. (Germany, September 25, 1928.)
—— Manufacture of ortho hydroxy azo dyestuffs containing chromium. 22,996. July 26. (Germany, July 26, 1928.)
—— Producing colour resists under aniline black. 23,019. July 26. (Germany, July 28, 1928.)
—— Treatment of waste products from petroleum refining. 23,053. July 26. (Germany, July 26, 1928.)
Imperial Chemical Industries, Ltd. Treatment of light hydrocarbons and kerosene. 22,417. July 22.
Imperial Chemical Industries, Ltd., and Traill, D. Manufacture of cellulose derivatives. 23,081. July 26.
—— Coating-compositions. 23,169, 23,170, 23,171. July 27. (United States, July 27, 1928.)
—— Esters of polyhydroxy compounds. 23,172. July 27. (United States, July 27, 1928.)
—— Synthetic resins. 23,173. July 27. (United States, July 27, 1928.)
Lilienfield, D. Manufacture of glycerine derivatives. 22,455. July 22.
Scottish Dyes, Ltd., Shaw, C., Thomas, J., and Thomson, R. F. Vat dyestuffs. 22,778. July 24.
Soc. Française de Catalyse Généralisée. Catalytic manufacture of synthetic acetic acid. 23,000. July 26. (France, January 11.)
—— Catalytic manufacture of synthetic acetic acid. 23,132. July 27. (France, January 26.)
Soc. of Chemical Industry in Basle. Manufacture of guanidine derivatives. 22,773. July 24. (Switzerland, July 24, 1928.)

Canadian Tariff Changes: Important Concession

OWING to the alteration in the Canadian tariff whereby the percentage of British material and/or labour in goods qualifying for the preferential tariff has been raised from 25 per cent. to 50 per cent., the question arose as to whether the old invoice forms altered to meet the new regulation would be acceptable or not. The Dominion authorities originally stated that forms so altered could be used until the first of this month, whereupon the F.B.I. sent to the Commissioner of Customs in Ottawa a cable asking if written or typed alterations to the forms would be accepted provided they were initialled in ink. To this the following reply was received: "Invoice forms with alteration initialled by exporter acceptable."

It will be seen from this that there is no particular way in which these forms need be altered so long as they are properly initialled by the exporter. As there has been a great deal of doubt throughout the whole country on this point and as the Canadian authorities in London have not been able to give a definite ruling up to date, this reply is of the first importance. The Canadian authorities have now allowed the use of the old invoice forms for a further indefinite period.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 7½d. per lb. Crude 60's, 2s. 2d. per gall.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 7d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. Dark, 1s. 6d. to 1s. 7d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5¼d. to 6d. per gall.; 1110, 6d. to 6¼d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 7½d. to 2s. per gall. Firm. Pure, 2s. to 2s. 2d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, 6¼d. to 6¾d. per gall. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 2d. to 2¼d. per gall. ex works. Salty, 7¼d. per gall.

NAPHTHA.—Crude, 8d¼. to 8¾d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent 90/190, 1s. to 1s. 3d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 40s. to 45s. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy, prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8¾d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8¾d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8¾d. per lb.

o-CRESOL 29/31° C.—5¼d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7¾d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8¼d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6¼d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 10d. to 2s. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5¼d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅛d. to 5⅞d. per lb.

LAMP BLACK.—£30 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£10 to £13 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 6d. to 6s. 9d. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 10½d. per lb, in 1-cwt. lots.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carraige paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 0½d. to 2s. 2d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 7d. per lb. Technical.—10½d. to 11½d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 4½d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE —5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—8s. 9d. per lb.
BISMUTH CITRATE.—8s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 3d. per lb.
BISMUTH SUBNITRATE.—7s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 3d. per lb.
BISMUTH OXIDE.—11s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 3d. per lb.
BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 1s. 11½d. per lb.; potassium, 1s. 8½d. per lb.; granular, 1s. 7½d. per lb.; sodium, 1s. 10½d. per lb. Prices for 1 cwt. lots.
CALCIUM LACTATE.—B.P., 1s. 2½d. to 1s. 3d. per lb., in 1-cwt. lots.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb. U.S.P., 2s. 9d. to 3s. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8½d. to 9½d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 19s. 9d. per lb. net; Synthetic, 12s. to 14s. per lb.; Synthetic detached crystals, 12s. to 16s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 5d. to 1s. 8d. per lb.
METHYL SULPHONAL.—18s. 6d. to 20s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—2s. 6d. to 2s. 9d. per lb.
PHENAZONE.—3s. 11d. to 4s. 2d. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—102s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 7d. per lb. in 1 cwt. lots.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. perlb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—47s. per lb.; in quantity lower.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—2s. 4d. per lb., B.P.C. 1923—2s. 7d. per lb. Prices for 1 cwt. lots. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. to 105s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 5d. per lb. Crystal, 2s. 3d. to 2s. 6d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—9s. 6d. to 10s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—12s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—14s. per lb.
COUMARIN.—8s. 9d. per lb.
CITRONELLOL.—10s. per lb.
CITRAL.—8s. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—12s. per lb.
GERANIOL (PALMAROSA).—21s. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. 9d. per lb.
ISO EUGENOL.—14s. 3d. per lb.
LINALOL.—Ex Bois de Rose, 12s. 6d. per lb. Ex Shui Oil, 10s. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 16s. per lb. Ex Shui Oil, 12s. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. per lb.
RHODINOL.—56s. per lb.
SAFROL.—2s. 6d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—17s. 6d. per lb. Ex Guaiacol, 15s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. 6d. per lb.
ANISE OIL.—3s. 6d. per lb.
BERGAMOT OIL.—17s. 6d. per lb.
BOURBON GERANIUM OIL.—22s. per lb.
CANANGA OIL, JAVA.—11s. 6d. per lb.
CASSIA OIL, 80/85%.—6s. 3d. per lb.
CINNAMON OIL LEAF.—7s. 9d. per oz.
CITRONELLA OIL.—Java, 2s. 8d. per lb., c.i.f. U.K. port. Ceylon, pure, 2s. 4d. per lb.
CLOVE OIL (90/92%).—9s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 16s. per lb.
LEMON OIL.—17s. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—20s. per lb.
OTTO OF ROSE OIL.—Anatolian, 70s. per oz. Bulgarian, 110s. per oz.
PALMA ROSA OIL.—12s. 3d. per lb.
PEPPERMINT OIL.—English, 87s. 6d. per lb.; Wayne County, 14s. 3d. per lb.; Japanese, 7s. per lb.
PETITGRAIN.—8s. 9d. per lb.
SANDALWOOD.—Mysore, 31s. per lb.: 90/95%. 19s. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, August 1, 1929.

CONSIDERING the time of the year, the inquiry for chemical products has been quite satisfactory, and prices continue steady and without any great fluctuation.

Export business has been better.

General Chemicals

ACETONE.—There is a steady demand at the firm rate of £75 to £85 per ton, with the product in a little better supply.

ACID ACETIC.—Demand has been brisk and supplies are still rather late in coming to hand, but the position is improving. Prices are unchanged at £36 10s. for 80% technical quality.

ACID CITRIC.—There has been quite a good demand, with the price firmly maintained at 2s. 2d. per lb. to 2s. 3d. per lb.

ACID FORMIC.—There is a good demand, with prices a little easier at about £41 to £42 for 85% in free carboys.

ACID LACTIC.—The standard pale quality is meeting with a good demand and the price remains firm at £43 per ton for 50% by weight.

ACID TARTARIC.—There is a brisk demand, with the price firm at 1s. 4¾d., less 5%.

ALUMINA SULPHATE.—The market is receiving quite a substantial inquiry and the price remains firm at £7 15s. to £8 per ton.

ARSENIC.—There is only a very small inquiry and the price remains easy at £16 5s. per ton, f.o.r. the mines.

BARIUM CHLORIDE.—There is a brisk demand, with only small supplies available for early delivery. Price is ruling firm at £12 per ton, ex store.

CREAM OF TARTAR.—Higher prices are quoted and the product continues extremely firm. Demand is brisk. The present price is £100 to £105 per ton for 99/100% B.P. quality, with higher prices possible.

COPPER SULPHATE.—The market is now steady at about £26 per ton, with a fairly regular demand being received.

FORMALDEHYDE.—The product is in very good request and the market is ruling steady at about £38 per ton.

LEAD ACETATE.—Quite substantial business is being placed at £43 10s. for white and £42 10s. for brown, with market steady.

LEAD NITRATE.—Price is unchanged at about £33 15s. and in small request.

LIME ACETATE.—The market is ruling firm at about £18 per ton, with supplies still on the short side and in brisk demand.

LITHOPHONE.—Steady trade is passing at about £19 15s. to £22 per ton, according to quantity and quality.

METHYL ACETONE is unchanged at £58 to £60 per ton and in moderate demand.

CHLORATE OF POTASH.—Steady at £28 to £30 per ton.

PERMANGANATE OF POTASH.—Demand is quite brisk and the product is firm at 5¼d. per lb.

POTASSIUM PRUSSIATE.—Substantial business is passing with the market firm at £63 10s. to £65 10s., according to quantity.

SODIUM ACETATE CRYSTALS.—There is still a scarcity of crystal quality and the material is holding firm at £22 10s. to £23 per ton. Inquiry is improving.

SODIUM BICHROMATE is in good request at the unchanged price of 35s. 8d. per lb. Discounts for contracts.

SODA HYPO PHOTOGRAPHIC CRYSTALS.—Demand is brisk and the market continues firm at £14 10s. to £15 per ton.

SODA NITRITE.—Rather more business has been passing and the price is firm at £20 per ton.

SODA PHOSPHATE.—There is an improvement in the demand, the dibasic quality being quoted at £12 per ton and the tribasic quality at £16 10s.

SODA PRUSSIATE.—The market is active at 4¾d. to 5¼d. per lb.

TARTAR EMETIC.—Rather firmer and in good request at 11d. per lb.

ZINC SULPHATE.—In steady demand at the firm rate of £12 per ton.

Coal Tar Products

The prices of coal tar products remain firm and there is better inquiry both for spot and for forward delivery in most of the products.

MOTOR BENZOL is still quoted at 1s. 5½d. to 1s. 6d. per gallon, f.o.r. makers' works.

SOLVENT NAPHTHA remains at about 1s. 2d. to 1s. 2½d. per gallon, f.o.r.

HEAVY NAPHTHA is quoted at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL is quoted at 3¼d. to 4d. per gallon on rails in the North, and at 4¾d. per gallon in London.

CRESYLIC ACID is still quoted at about 1s. 10d. per gallon for the 98/100% quality, and at about 1s. 7d. per gallon for the dark quality 95/97%.

NAPHTHALENES are firm at about £4 10s. per ton for the firelighter quality, at £5 per ton for the 74/76 quality, and at £6 to £6 5s. per ton for the 76/78 quality.

PITCH.—The market continues steady but inactive at 40s. to 42s. per ton, f.o.b. East Coast.

Nitrogen Products

Sulphate of Ammonia.—Owing to the fact that the large Continental producers have announced their prices, the market is more stable, and the price for neutral quality for August shipment is £8 15s. 9d. per ton, f.o.b. U.K. port in single bags. From time to time, small quantities of ordinary quality are offered from Continental ports at prices lower than these. At present, buyers seem to be in no hurry to purchase their requirements for periods ahead.

Home.—The home price of £9 9s. per ton, delivered in 6-ton lots to consumer's nearest station remains in force until the end of September. No price has yet been quoted for forward periods, but it is anticipated that a rising price scale will be in operation.

Nitrate of Soda.—On account of the agreement made with Chilean producers and the leading producers of synthetic nitrogen, the price of nitrate of soda in U.K. markets is the same as that for sulphate of ammonia, and it is expected that this will be the case in other markets.

Latest Oil Prices

LONDON, July 31.—LINSEED OIL was firm and 2s. 6d. to 5s. per ton higher. Spot, £36 10s.; August, £34 12s. 6d.; September, £34 10s.; September-December, £34 5s.; January-April, £34, naked. RAPE OIL was quiet. Crude extracted, £41; technical refined, £43, naked, ex wharf. COTTON OIL was quieter. Egyptian crude, £33 10s.; refined common edible, £38; deodorised, £40, naked, ex mill. TURPENTINE was quiet and occasionally 3d. per cwt. lower. American, spot, 42s. 9d.; August-December, 42s. 3d.

HULL, July 31.—LINSEED OIL.—Spot and July, £35 12s. 6d.; August, £35 10s.; September, £35 5s.; September-December, £34 17s. 6d.; per ton, naked. COTTON OIL.—Egyptian crude spot, £32 15s.; July-August, £32 5s.; edible refined, spot, £36 5s.; technical spot, £36; deodorised spot, £38 5s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £35 15s. per ton, naked. GROUNDNUT OIL.—Crushed/extracted spot, £36 10s.; deodorised spot, £40 10s. per ton. SOYA OIL.—Extracted spot and crushed spot, £33 5s.; deodorised spot, £36 15s. per ton. RAPE OIL.—Crushed/extracted, spot, £41; refined spot, £43 per ton. TURPENTINE, CASTOR OIL and COD OIL unchanged.

Nitrate Prices

THE prices of Chilean nitrate are amended by the following regulations issued by the Chilean Nitrate of Soda Producers' Association for the centralised selling of nitrate during the season 1929–30:—(1) The authorised distributors shall hold stocks in the principal ports of Great Britain under arrangements determined in Valparaiso; (2) the prices at which 95 per cent. nitrate of soda shall be sold in lots of not less than 6 tons shall be as follows: Per ton of 2,240 lb. gross weight in original bags as imported, less 1 per cent. for tare of bags, carriage paid to any railway station in Great Britain selected by the buyer, or main ports in the Isle of Man, payment net cash on or before delivery at seller's option.

	£	s.	d.
1929.			
August/September delivery	9	9	0
October	9	11	0
November	9	14	0
December	9	17	0
1930.			
January delivery	10	0	0
February/June	10	2	0

South Wales By-Products

SOUTH Wales by-product activities are unchanged. There is a fairly active inquiry in most products, but actual business remains slow. Pitch values have strengthened to a basis of 39s. to 43s. per ton, but patent fuel manufacturers and other large users are buying only moderately. Road tar has a steady, though moderate demand at 10s. 6d. to 13s. per 40-gallon barrel. Crude tar is unchanged at 25s. to 30s. per ton, but refined tars are in fairly strong demand. Values, however, of both gasworks and coke oven tar are unchanged. Solvent naphtha is quiet round the 1s. 3d. to 1s. 6d. per gallon mark, and a similar remark applies to motor benzol at from 1s. 4½d. to 1s. 7d. per gallon. Heavy naphtha has only a small call at 11d. to 1s. 1d. per gallon. Crude naphthalene remains weak, and the same applies to whizzed. Patent fuel and coke exports remain unsettled with values unchanged.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, July 31, 1929.

THE heavy chemical market during the past week has been fairly active and there is an indication, now that local works have again opened, of consumers being more ready to anticipate their future requirements. Export inquiry has also been fairly good. There are no changes of any importance to record.

Industrial Chemicals

ACETONE, B.G.S.—£76 10s. to £85 per ton ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—This material is still scarce for immediate supply but prices remain unchanged as follows: 98/100% glacial, £56 to £67 per ton according to quality and packing, c.i.f. U.K. Ports; 80% pure, £37 10s. per ton ex wharf; 80% technical, £37 10s. per ton ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC ICE CRYSTALS.—In good demand and price increased to about 6¾d. per lb. delivered or f.o.b. U.K. ports.

ACID CITRIC B.P. CRYSTALS.—Quoted 2s. 2d. per lb., less 5% ex store, prompt delivery. Rather cheaper offers for early delivery from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at about 3¼d. per lb., ex store. Offered from the Continent at 3⅛d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works for 144° quality, £5 15s. per ton for 158°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Spot material now quoted 1s. 4½d. per lb., less 5% ex wharf.

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA, CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Quoted £35 per ton, c.i.f. U.K. ports. Spot material on offer at about £39 per ton, ex store.

ARSENIC, WHITE POWDERED.—Unchanged at £18 5s. per ton, ex wharf, prompt despatch from mines. Spot material quoted £19 15s. per ton, ex store.

BARIUM CHLORATE.—Quoted £10 10s. per ton, c.i.f. U.K. ports, prompt shipment.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4 ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 5s. per ton to £4 15s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Remains steady at about £36 10s. per ton, ex store.

GLAUBER SALTS.—English material, quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Quoted £36 to £36 10s. per ton, according to quantity, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 10s. per ton. Brown on offer at about £39 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 4d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4⅞d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE, 96/98%.—Spot material now quoted £26 10s. per ton, ex store. Offered from the Continent at £25 10s. per ton, c.i.f. U.K.

POTASSIUM CHLORATE, 99¾/100%.—Powder quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5½d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb., ex wharf.

SODA, CAUSTIC.—Powdered, 98/99%, £17 10s. per ton in drums; £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums, and 70/75%, £14 2s. 6d. per ton in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅝d. per lb., delivered buyers' premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 1s. 3d. per ton, ex quay, minimum 4-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Ordinary quality £10 13s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, with usual extras for smaller quantities and refined qualities.

SODIUM PRUSSIATE.—Spot material on offer at 5½d. per lb., ex store. Quoted 5⅝d. per lb., ex wharf to go forward.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption :—Solid 60/62%, £9 per ton; broken, 60/63%, £10 per ton; crystals, 30/32%, £7 2s. 6d. per ton, delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE, 98%.—British material now quoted at £22 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—Please note that the above prices are for bulk business and are not to be taken as applicable to small quantities.

Rare Earth Elements in Glass

PROFESSOR WEIDERT, of the Kaiser Wilhelm Institute for Silicate Research of Berlin, and director of the technical optics laboratory of the Berlin Technical High School, recently discussed the use of the rare earth elements as components of glass. He pointed out that one gram of neodymium or praseodymium cost 20 marks before the war, but was now much cheaper. Didymium glass was used during the war for secret optical telegraphy. Glass containing cerium was used in spectacles to cut out ultra-violet light, and zirconium was used in the production of cloudy opal glass. Neodymium glass is especially suitable, by insertion before mercury vapour lamps, for the production of monochromatic light. This method deserves introduction in all investigations in which monochromatic light is indicated, which have hitherto been carried out with sodium light, *e.g.*, in the sugar industry. Neodymium makes red or green appear sharper; it may, therefore, be used to correct incomplete colour-blindness. Recently, neodymium and praseodymium have been applied extensively in the manufacture of art glasses. In these, the colour depends on the thickness of the glass, so that parts of varying thickness show a changing play of colours; and the glass is, therefore, used in the production of artificial gems. The colour also depends on that of the incident light; for example, praseodymium glass is green in daylight and colourless in candlelight.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, August 1, 1929.

So far as the direct results of the cotton trade lockout in Lancashire are concerned, the dispute so far appears to have had little effect on the demand for chemicals on this market, although obviously if it develops into a long-drawn-out affair—an event which, by the way, is not generally expected—the consumption of chemicals is bound to be appreciably affected. Meanwhile, contract deliveries locally are maintained at a fair level.

Heavy Chemicals

Inquiry for phosphate of soda is of moderate extent and at round £11 10s. per ton quotations are held. Bichromate of soda continues firm and a fair business is going through at about 3⅝d. per lb. Caustic soda is moving steadily into consumption, particularly against contracts, makers' prices ranging from £12 15s. to £14 per ton, according to strength. There is only a comparatively quiet demand about for saltcake, with bulk quotations in the neighbourhood of £2 10s. per ton. Sulphide of sodium is a rather quiet section of the market, but values are reasonably steady at about £7 10s. per ton for the commercial grade and £9 for the 60–65 per cent. concentrated solid material. Bicarbonate of soda is well held on a contract basis of £10 10s. per ton, and a fairly good demand for this has been reported this week. Alkali, also, seems to be moving steadily and prices are firm at round £6 per ton. With regard to hyposulphite of soda, a moderate business is being put through and values are unchanged at £15 10s. per ton for the photographic grade and £8 15s. for the commercial. Inquiry for chlorate of soda since last report has been on the quiet side, with current offers ranging from about 2½d. to 2¾d. per lb. Prussiate of soda keeps steady at from 4⅜d. to 5¼d. per lb., according to quantity, and buying interest in this material is still fairly satisfactory.

On the whole, potash prices show little sign of ease. There is a quiet demand about for permanganate, with the B.P. quality quoted here at round 5½d. per lb. and the commercial at 5⅜d. Chlorate of potash is selling in moderate quantities at an average current value of 2⅞d. per lb. Caustic potash meets with a fair volume of inquiry, with offers ranging from about £32 10s. per ton, upwards, according to quantity. Carbonate of potash is about unchanged on the week at £25 10s. per ton for the 96–98 per cent. solid quality. The demand for bichromate of potash is about maintained at its recent level, with quotations on the basis of 4⅜d. per lb. There is a moderate inquiry about in the case of yellow prussiate of potash and prices are firm at from 6¾d. to 7¼d. per lb., according to quantity.

Buying interest in sulphate of copper at the moment is on relatively quiet lines, with current offers at from £27 to £27 10s. per ton, f.o.b., for British material. Arsenic is moving in limited quantities but at round £16 per ton at the mines for white powdered, Cornish makes, there has been little alteration in the price position. The lead compounds are quiet and, if anything, easy in tendency at £39 and £40 per ton for brown and white acetates, and from £33 10s. to £34 for nitrate. Acetate of lime is in moderate request at £8 to £8 10s. per ton for brown and round £16 10s. for grey.

Acids and Tar Products

The movement of oxalic acid is comparatively slow, but prices of this material are maintained at about £1 12s. 6d. per cwt., ex store. A quietly steady business has been reported this week in the case of tartaric acid, and values are held at from 1s. 4¾d. to 1s. 4½d. per lb. Citric acid is unchanged in price at round 2s. 1d. per lb., though there is no special feature to record concerning the demand for this material. Acetic acid is fairly active and quotations firm at £66 to £67 per ton for the glacial quality and round £36 for the 80 per cent. commercial grade.

Pitch meets with a moderate amount of inquiry at £2 2s. 6d. per ton, f.o.b. There has been no apparent improvement in the demand for creosote oil, and values are on the easy side at from 2¾d. to 3d. per gallon, naked, at works. Carbolic acid is in steady request and quotations are firm at about 2s. 3d. per gallon for crude, 60's quality, and round 7¼d. to 7½d. per lb., f.o.b., for crystallised. Solvent naphtha is in moderate demand at 1s. 2d. per gallon, naked.

Company News

Broken Hill Proprietary Co., Ltd.—A cabled message from Melbourne states that, subject to audit, the net profit for the year ending May 31, 1929, was £332,671, after providing £317,592 for ordinary depreciation, and £100,000 for special depreciation and £81,094 for debenture interest. The provision for ordinary depreciation in the previous year was £284,058, and special depreciation £35,000. Debenture interest took £98,952. After charging these items, the net profit was £222,617. A half-year's dividend of 1s. per share was paid in May last. For 1927-28, the year's dividend totalled 10 per cent.

British Visada.—The report for the period ended July 15, 1929, states that the directors have under consideration the preparation of a scheme for the rearrangement of the capital. This will be submitted to the shareholders at the earliest possible date. A contract for the sale of the company's undertaking and assets to British Breda Co. was carried into effect on July 15, 1929, subject to slight extension of period during which the company is restricted in dealing with its holding. In consideration the purchasers agreed to extend the time for the payment of £10,000 of deficit on realisation of liquid assets and discharge of its liabilities to June 30, 1930. British Breda Silk, through its subsidiary Breda Visada, is carrying on works at Littleborough and continuing to produce high-grade viscose silk in substantial quantities. Accounts as at July 15, 1929, show a deficiency of £250,300, consisting of development and experimental expenditure £89,655, preliminary and formation expenses £33,143, and difference on book values on sale of undertaking and assets £127,502.

Dye and Colour Dealers' Affairs

The affairs of Frank Smith, who was adjudged a bankrupt on December 20 last, came before Mr. Registrar Mellor in the London Bankruptcy Court on Tuesday on the hearing of his application for an order of discharge. The Official Receiver said that a separate receiving order was made against the estate of Larcombe, but on January 1 the Court made an order consolidating those proceedings with those *in re* Smith. According to the statement of affairs of the firm as submitted by the applicant the ranking liabilities amounted to £2,099, and as far as the Official Receiver was aware such estimate was approximately correct. The applicant also submitted a statement of his separate affairs, and this disclosed debts £378. The only asset disclosed by the debtors was the amount paid into the Court by the Receiver of the partnership business in respect of which he (the Official Receiver) had received £812 odd. But after payment of the costs of realisation, of both petitions in bankruptcy and of preferential claims of which he had received notice, the dividend payable to unsecured creditors would be small. Continuing, the Official Receiver said that in February, 1915, the applicant and Larcombe entered into a verbal arrangement under which they continued in partnership a business previously carried on by the applicant at 57, Gracechurch Street, as dealers in dyes and colours. They afterwards traded there under the style of Smith, Larcombe and Co., and in 1925 they removed to 3, Haydon Street, Minories. In March, 1927, the authorities issued writs for recovery of income tax and excess profits duty for about £2,400, and an employee sued them for upwards of £630 in respect of a share in the profits, obtained judgment and garnished the balance standing to the credit of one of the banking accounts and also amounts due from several of the customers. In March, 1927, the applicant also began proceedings for dissolution of the partnership, and in the following month a receiver was appointed and he continued the business until July 13, 1927, when it was sold for £900, which was paid into Court. The applicant added that after the receiver disposed of the business of the partnership he began dealing in dyes from an office at 10, Philpot Lane, where he still had the use of an office. The Official Receiver opposed the application on the grounds that the applicant's assets were not of a value equal to 10s. in the £ on the amount of his unsecured liabilities, and that he had omitted to keep proper books of account. His Honour granted the discharge subject to a suspension of only three months.

River Pollution

Injunction Against Artificial Silk Company

COMPLAINTS of the serious pollution of the River Gipping, near Stowmarket, Suffolk, causing conditions along the banks which were alleged to be unbearable, were brought to the attention of Mr. Justice Clauson in the Chancery Division on Tuesday on a motion of Mr. William Frederick Freshwater against the British Acetate Silk Corporation, Ltd.

Mr. F. K. Archer, K.C., for Mr. Freshwater, said that he desired an injunction restraining the nuisance, and there was another motion by a Mr. Quinton against the same defendants asking for similar relief.

Tons of Dead Fish

"Since 1925," Mr. Archer said, "the lives of a good many people in this countryside have been made very burdensome, because the river for miles has been stinking. Tons of fish have been taken out of the river dead, and some people have been made ill. In fact, as late as July 25 Mr. Freshwater was physically ill through the state of the river."

Mr. Justice Clauson: How is it that this has been going on for four years?

Mr. Archer: My client is a poor man, and Mr. Quinton (for whom Mr. Gavin Simonds, K.C., appears) has an action in which an undertaking was given to abate the nuisance. Mr. Freshwater was advised not to move, but to wait and see if a cure could be found.

The defendant company, said Mr. Archer, installed a plant to remove the waste sulphide that went into the river, and perhaps it did, but they said that they were disappointed with the result, and had ordered a second plant. One of the causes of the trouble was that the sulphide turned into sulphuretted hydrogen, and there was also sulphuric acid and glucose which released sulphur into the river.

"I have got two bottles of water from the river, and if anybody doubts its condition let them open the bottles and see," said Mr. Archer.

Attitude of Local Authorities

There has been a local inquiry, but apparently the position which the authorities took up was that they could do nothing, because the matter was in the hands of the Chancery Court.

He read an affidavit alleging that farmers along the river were in a state of desperation because of the state of things, and that some had threatened to refuse to pay rates, that the fumes turned metal articles in houses black, and that residents near could not open their windows.

Company's Efforts at Abatement

For the company, Mr. C. A. Bennett, K.C., read an affidavit by Dr. Stoyle, the company's chief chemist, giving details of the efforts which they were making to abate the nuisance. They had, he said, filtration and evaporation plants, which when in working order would cover an extent of two acres.

Mr. Bennett said that they wanted to help the plaintiffs as much as possible, but it might be that the company were not the sole cause of the nuisance. They succeeded the Bulmer Rayon Co. at the works, and that company poured all their effluent into the river without any treatment, and possibly they (the defendant company) were suffering from a foul river-bed and a small flow of water.

Mr. Gavin Simonds, K.C., for Mr. Quinton, said that on his motion Mr. Justice Luxmoore made an order on April 26 requiring the defendants to undertake not to discharge iron sulphide into the river, not to increase production until their new plants were completed, and to use their utmost speed to complete them.

Mr. Bennett said that the company had spent £20,000 on the new plants, and all he wanted was to let them have a fair trial.

Mr. Justice Clauson said that he would grant an injunction in each case, restraining the company from polluting the river, but suspending them over August 20, the costs to be costs in the actions.

New Companies Registered

WILSON AND JUBB (LEEDS), LTD.—Registered July 30 Nominal capital, £1,500 in £1 shares. Objects: To carry on business as chemists, metallurgists, etc. A subscriber: H. G. Schofield, 6, Eccleston Street, London, S.W.1.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette, &c.

Companies Winding Up Voluntarily

HUTTON (H. W.), LTD. (C.W.U.V., 3/8/29.) By reason of its liabilities, July 16. W. Tiplady, Prudential Building, New Street, Huddersfield, certified accountant, appointed as liquidator.

ROWLANDS (P.) AND CO., LTD. (C.W.U.V., 3/8/29.) By special resolution, July 4, confirmed July 22. E. R. Jackson, 19, Old Hall Street, Liverpool, appointed as liquidator.

TEXTILE DYES AND DEVELOPMENT CO., LTD. (C.W.U.V., 3/8/29.) By special resolution, July 1, confirmed July 19. T. A. Evans, 2 and 3, Salisbury Court, Fleet Street, London, E.C.4, appointed as liquidator.

ZINC OXIDES, LTD. (C.W.U.V., 3/8/29.) By reason of its liabilities, July 20. W. Boniface, 10, Serjeants' Inn, Fleet Street, E.C.4, appointed as liquidator. Meeting of creditors at liquidator's office, at 12 noon, on Wednesday, August 7.

Chemical Workers' Diseases

Improvement in Dyestuff Works

THE chief discussion at the concluding session of the British Medical Association in Manchester, under the presidency of Mr. W. F. Dearden, followed a paper by Dr. Thomas H. Wignall on "Incidence of disease of the bladder in workers in certain chemicals."

Dr. Wignall said he had lived in the vicinity of a chemical works for nearly 30 years, and from 1900 to 1910 had, as patients, many men who had worked at the factory for several years. Since 1918 he had held the position of appointed surgeon for the factory.

In the early periods (1860 and onwards) of the making of certain dyes from coal-tar products, arsenic was largely used. Workers were not protected in any way, and cases of toxæmia were only beginning to be observed. At those times any man who offered himself got a job if one were available. Cases were sent to the doctor simply as they occurred, and no records were kept.

To-day only mature men below a certain age were taken. They were examined as to indications of good health and evidences of skin trouble. A well-fitted first-aid station and a competent nurse were provided, and all cases were seen medically on the spot as soon as possible after report. Men were encouraged to report on any deviation from general health, and such cases were investigated, there being an attempt to promote good feeling always between the doctor, nurse, and men, so that no trivial report was ignored and all cases were recorded.

Effects on Dyestuffs Workers

Quite a number of intermediates, as well as finished dyestuffs, could produce in some persons, varying with idiosyncrasies—for example, sweating, and colour of hair and skin—extensive acute dermatitis, and this often recurred in the same individual if re-employed. Up to 1910 he had personal knowledge of three men working on a certain by-product of coal-tar who died from urinary trouble due to neoplasm. It was possible that those men might have suffered from arsenical poisoning, since surgical diagnosis and treatment was then less precise.

Since 1918 this by-product had been in fairly continuous production. All the men engaged on those parts of processes where there was risk in handling the material wore gloves; they were not in the open air. Others, working on distillation, were in the open air, and ordinarily did not handle the product, because pipe lines were used to transfer from one vessel to another by pressure. All the men were provided with baths, which they certainly used daily. There were good facilities for washing hands before meals, and separate lockers for working clothes and day clothes. The men did not go home in their working clothes, which were washed every two days. There was a canteen away from the plant for food, etc., and milk was given to each man daily.